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ABSTRACT

This newsletter examines education technology issues of concern to school faculty and administrators. Regular features in each issue include educational technology news, a book review, and a question and answer column. The cover articles during this volume year are: "Data Access Issues: Security Vs. Openness"; "Creation of an Information Infrastructure" (John D. Hoh); "Enterprise-Wide Computing: A Vision Takes Shape"; "Educational Change Through Technology"; "Strategic Planning: A Business Plan for Computing"; "Hot Issues 1992-1993"; "Decision-Making for Academic Computing: the Cascade Effect"; "New Leadership at EDUCOM: Interview with Robert C. Heterick"; "Exemplary Leadership and IT Excellence"; "IT Excellence: It's Not Instant Pudding"; "Quality Distributed Data Management" (Lore Balkan and Gerry McLaughlin); and "Choosing a New System: Two Schools Do It Right." (MAS)

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April 1992

Volume 8
Number 1

THE EDUTECH REPORT

The Education Technology Newsletter for Faculty and Administrators

ED 387 126

Data Access Issues: Security Vs. Openness

One of the major benefits of today's technology is being able to store large amounts of data, process the data efficiently, and then get that data back out in report form or on screens quickly and easily. Although we are not fully there yet, we are certainly quickly moving toward a world in which data that used to be kept in file cabinets in individual offices, on index cards in academic laboratories, or on microfilm in the library can be seen by anyone from any location. That, of course, is both good news and bad news. At the very same time that the technology is enabling access, issues of security, privacy, and confidentiality are taking on new importance. Further complicating matters is the traditional attitude toward data "ownership" found in most institutions today. Never before has it been as important for colleges and universities to develop a set of consistent, well-publicized policies about data access and access restrictions.

In terms of institutional data, access can be thought of as a spectrum of activities and attitudes ranging from a perception of ownership and control over certain data (and hence, a reluctance to share it) to, at the other end of the spectrum, full accessibility to all of the institution's data by any affiliated person, including students. Most colleges and universities that have developed data access policies have decided that a point somewhere in between these two extremes is appropriate. Regardless of what decisions are made, or how the decisions might change over time, the important thing is that the issues are recognized and discussed, decisions are made, and results are clearly communicated to everyone concerned.

The primary issues that need policy guidelines are these: whether there will be a single, integrated information source of institutional data;

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> **"Essentially, the reality that I and my colleagues have looked at is that of technology as the handmaiden of the existing system, and as such it isn't very important in most schools. The exception is with regard to libraries, specifically information systems. I'm impressed in a few libraries to see the beginning, a real flicker, of libraries being real information centers of a very profound kind."**
>
> Theodore Sizer
> Brown University
> Interview
> *Technos*
> Spring 1992

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NEWSBRIEFS

UNIVERSITY OF MIAMI AND IBM LAUNCH PARTNERSHIP

The University of Miami announced recently that it has entered into a partnership with IBM to double the number of computers available to University of Miami students and to expand mainframe capacity and access to worldwide computer networks. The $16 million partnership is unique in scope, affecting 21 areas of study and research at the largest private research institution in the Southeast. According to Jane Ryland, president of CAUSE, the association for the management of information technology in higher education, "Investments in information technology can make a real difference in enhancing the education, research, and management functions of an institution. The rest of the higher education community will be eagerly watching for results from the leadership shown by the University of Miami and IBM in forming this partnership."

NEW ELECTRONIC NEWSLETTERS

EUITNEWS, an experiment in providing short, frequent updates directly to participants in EDUCOM's Educational Uses of Information Technology (EUIT) program by e-mail or FAX, is now available. Volume 1, Number 1 was launched in mid-March, and can be acquired through e-mail by sending a request to EUITEDIT@EDUCOM.EDU.

Digital Equipment Corporation has also started an electronic newsletter. "DECNEWS for Education and Research" is designed to provide a compact, timely source of news about Digital's products, programs, and applications for education and research customers. It will also give customers access to more detailed documents such as information sheets, white papers, and press releases electronically. Those interested in receiving the newsletter are asked to contact DECNEWS@mr4dec.ENET.DEC.COM to receive a copy of the first issue and instructions on how to subscribe.

EDUCOM PRESIDENT KEN KING RESIGNS

Kenneth M. King, President of EDUCOM, has announced his resignation, to take effect as of December 31, 1992. Dr. King said that by this fall he will have fulfilled his commitment to EDUCOM's Board of Trustees to serve as president for five years and that he believes this is a good time for a transition in leadership. EDUCOM is in the process of developing a new long-term strategic plan and will be able to recruit a new president optimally suited to implementing that plan.

Under Dr. King's stewardship, EDUCOM has experienced significant growth in membership, has achieved national recognition for leadership in creating the National Research and Education Network, and has become a strong voice for advocating higher education information technology in the national political arena by moving its headquarters from Princeton, New Jersey to Washington, D.C.

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Book Review

Technology From a Special Perspective

Computing Strategies in Liberal Arts Colleges

Edited by Martin Ringle

EDUCOM Strategy Series on Information Technology

About six years ago, a group of schools which came to be known as the Consortium of Liberal Arts Colleges (CLAC) began to deal seriously with technology issues on their campuses. Feeling, perhaps, not well served by the major national computing organizations, these schools, somewhat unique in both size and mission, wanted to share information, to learn from each other's experiences, and in general, to see what could come of associating in this manner. Judging by the quality of this book, good things have indeed come.

Computing Strategies in Liberal Arts Colleges is the latest in the EDUCOM Strategy Series, and similar to other books in the series, this one is a collaborative effort (although it is definitely not a case study book, thank goodness). Edited by Martin Ringle of Reed College, the book presents us with a lot of authors, but also with a consistent style and intent. Thus we have a very effective collaboration that focuses not just on descriptions of what certain colleges have done to meet the challenges of information technology, but also a great deal of insight into why things were done in certain ways, and how decisions were made. Most of the authors are directly involved with planning for and delivering information technology to their campuses, so they are in a position to provide valuable experiences as well as perspective.

The book is organized into four parts: planning and finance; organizational issues; networks, distributed computing, and telecommunications; and the impact of computing. The chapters cover the full range of higher education computing issues, from dealing with the costs of technology to building the infrastructure, from faculty development to hiring a consultant, from setting up advisory groups to dealing with burnout among the computer staff.

The topics are important ones, but the timing of this book is also especially important. We have reached a critical junction in higher education computing; more institutions are beginning to take stock of what has happened in the last few years of very rapid growth, expansion, and expense, and are trying to figure out what should be done at this point to intelligently prepare for the future. As Ringle rightly points out, "...it is becoming increasingly clear that growth will level off during the next few years and that the shape of computing in the latter part of the nineties is likely to set the standard at liberal arts colleges for decades to come." A book like this, then, that provides some good input into an institution's technology self-analysis and planning, is an invaluable resource.

The only trouble with this book is the title. While in some respects, issues and concerns at liberal arts colleges differ significantly from larger institutions, a great amount of the information and insight presented here applies to all schools, not just liberal arts colleges and not just small colleges. But the book's title is unfortunately bound to decrease the likelihood that everyone in higher education who ought to read this book will, in fact, even open the front cover.

"At some [small] colleges, skepticism regarding computerization still lingers...," writes Ringle in the introduction. It's safe to say that this skepticism still lingers throughout all of higher education, and in fact, has led directly to technology not yet even beginning to fulfill its true potential, especially on the academic side. Robert Gavin, president of Macalester College, writes in the preface, "Twenty-five years ago the president of a liberal arts college would not be writing about the importance of computing." The truth is that most college presidents, liberal arts college or otherwise, would not write about it today, either.

That's what makes books like these so important. Yes, they can help us model certain computing practices that seem to work, and they can help us avoid the mistakes that others have already made. But perhaps their most important contribution is in promoting the view that higher education information technology is a substantive, serious, high-level issue that ought to be on the minds of our institution's decision-makers.

For ordering information, contact John Gehl at EDUCOM in Washington, DC; (202) 872-4200. ■

Further Adventu

Note: The fortunate readers of Connect, the Journal of Departmental Computing at the University of Cincinnati (UC) have been treated over the years to articles on the adventures of PiranhaCorp, a company that has perfected the concept of user-hostile computing. Sad to say that budgets cuts have forced the journal to be discontinued, but Jonathan Kopke, Senior Systems Engineer in the Medical Computer Services Division of the UC Computing Center (and Chair of the PiranhaCorp Board of Directors), graciously consented to allow us to follow up on our original series of excerpts.

About PiranhaCorp

As regular readers will recall, PiranhaCorp (whose motto is "Real Programmers Don't Need Menus") is the world's foremost distributor of user-hostile computer products such as *PiranhaClean*, "The Janitorial Management System That Really Bites The Dust" and *PiranhaKey*, "The Keyboard Mapping Utility That Helps You Keep All Your Keys Under Your Thumb."

Other products include *The Eel*, "The Surge Protector That Lets You Take High Voltage Problems Into Your Own Hands;" *FishFood*, "The Computerized Diet Plan For People Who Really Want To Take Cholesterol Problems To Heart;" and the Piranha Branch eXchange (PBX)—the telephone system marketed under the motto, "What We Have Here Is A Failure To Communicate."

In recent months, a number of bad pennies have tried to cash in on PiranhaCorp's notoriety. The most blatant imitator is PariahCorp with their motto, "We Never Stop Saying SO WHAT," but two other major contenders have also entered the field: BorderLine Software ("Run the Borderline") and Albatross Artificial Intelligence Systems ("Let An Albatross Pick Your Brain").

Blyte Magazine

In addition to its hardware and software products, PiranhaCorp publishes *Blyte Magazine*, founded in response to the company's concern about too much cooperation in the user-hostile computing industry leading to the accidental development of standards. Recent articles have included a product focus on "Seedy ROM Storage" and an in-depth section entitled "Why Settle for a No-Name Virus: The Fastest Spreading Infections Yet."

PiranhaCorp has become especially concerned in recent months that there were only two major incompatible microcomputer architectures: IBM's proprietary Micro Channel Architecture (MCA), and the Compaq-Tandy-Zenith Extended Industry Standard Architecture (EISA). To offset the possibility of user comprehension, *Blyte* is promoting the so-called "Old MacDonald Architecture" with Expensive Industry Established Input/Output (EIEIO).

Like other computer journals, *Blyte* is financed entirely by advertising. Nonetheless, *Blyte* emphasizes that its writers—similar to their counterparts in other trade journals—remain completely uninfluenced by the fact that their salaries are paid by the developers of the products they are evaluating. Admittedly, this makes it hard to explain some of *Blyte*'s recent reviews, such as "*PiranhaCalc* Version 34.6d: Dynamic Diagonal Display Slants Statistics." In fact, it would appear that only PiranhaCorp products have ever merited *Blyte*'s coveted Achilles' Seal of Approval.

Carping about PiranhaWare

One of the products listed in the new PiranhaCorp advertising is *PiranhaThesaurus*, which features antonyms as well as synonyms. We thought this would be useful until we put the cursor on the word "inflate" and pressed the antonym key, and *PiranhaThesaurus* changed it into FLATE. *PiranhaThesaurus* also thinks that the opposite of "undulating" is DULATING. Fortunately, we're smart enough to catch such stupidity.

PiranhaNet is another TELLIGENT creation listed in the PiranhaCorp advertising. *PiranhaNet* doesn't actually serve any purpose; it's only a token network. We hope it is DICATIVE of the trends in networking.

PiranhaDOS is a set of OVATIVE extensions to the popular operating system. While some competent and EPT programmers might occasionally find a use for the command ERASE/W (erase and weep), few if any would really need ERASE/CHK (erase and commit hari-kari). Furthermore, we don't understand the function of the command FLOORMAT C:.

Perhaps we should have been more cautious, but in the PiranhaCorp advertising, the "School of Piranhas" looked so impressive, and the price so ORBITANT, that all of our programmers were on their way to the School before we noticed the list of satisfied customers: Osborne Computers and the DeLorean Motorcar Company.

When our programmers arrived at the School of Piranhas, they discovered that the highly touted "luxury accommodations" were nothing more than a cluster of tents. Persons who had not yet begun their training were housed in the "Future Tents," while those who had successfully completed the course were accommodated in the "Past Perfect Tents." Several disoriented people sleeping outside on the ground appeared to be dangling participants.

The first session of the training program was a screening test to

es of PiranhaCorp

assess the current knowledge of the attendees. For future reference, the correct response to the question about the number of programmers needed to change a light bulb is D ("None—that's hardware").

After the test, a huge group of people crowded into the classroom for the DIVIDUALIZED instruction. The instructor had been billed as "a well known commercial spokesperson" who "appears regularly on network TV," but it was still a surprise to encounter Teddy Ruxpin in that setting. And we really don't believe the claim that he can also function as a tape backup unit.

The course was not a total waste, however, since each participant got to take home a PiranhaCorp product valued at $49.95. Knowing how many programs call for you to "Press Any Key When Ready," PiranhaCorp gave out durable plastic keyboard templates which point out the Any Key.

PiranhaCorp spawns new line

According to our trusted informer, PiranhaCorp is floundering badly. The company is up to its gills in debt. The days are gone when innocent buyers would bite hook, line, and sinker for PiranhaCorp's notorious bait-and-switch tactics. Therefore, PiranhaCorp has decided to reel in new customers with a whale of a new, user-friendly line of products.

PiranhaCorp realized that what makes most software too difficult for the average person is that it has too many complicated features. Therefore, PiranhaCorp has decided to introduce *PiranhaLITE*, "The Programs with One-Third Fewer Features Than Any Other Software." PiranhaCorp will soon be bombarding the city with commercials which will feature the Radio City Music Hall Diskettes, and which will promote *PiranhaWrite LITE* with the motto, "Everything You Always Wanted In A Word Processor, And Less."

We were able to get hold of a beta test version of *PiranhaWrite LITE*, and we have to admit that it's a uniquely simple word processing system. According to the advertising on the package, "As you type, your keystrokes are immediately relayed to your printer. No complicated editing! No confusing menus! No unreliable diskettes! When you're done typing, your document is done!" The software works only with PiranhaCorp's proprietary "Micro-Fish Printer." In another attempt to become user-friendly, however, PiranhaCorp has designed the Micro-Fish so that when it's used in Portrait Mode, it produces one 8x10, two 5x7's, and a dozen wallet-sized copies of every document.

Furthermore, we hear that PiranhaCorp is developing a three-dimensional spreadsheet, *PiranhaCalc LITE*. Rather than having to remember complicated commands to scan forward and backward through the third dimension, users of *PiranhaCalc LITE* will simply wear inexpensive cardboard glasses with one red lens and one green lens. The program is guaranteed to work on any kind of a table—kitchen table, coffee table, even a ping pong table.

Our informer has also leaked information about *PiranhaFile LITE*, a user-friendly database which is simply a computer interface to a Rolodex. One attractive feature of this system is that on hot days, the user can send the program into an endless loop and get a good, strong breeze from the spinning Rolodex.

From everything we can gather, PiranhaCorp is scaling new heights in trying to avoid going belly-up. We have to agree with the Annual Report PiranhaCorp sent to its shareholders: "PiranhaCorp is the company that takes a sacking and keeps on hacking." We can't wait to see *Piranha FREE*.

PiranhaCorp drops letter bomb

In the past few years, the entire business world has been enveloped by electronic mail, and PiranhaCorp has decided that it's time they put their stamp on this market. Hence, we have *PiranhaMail*.

To PiranhaCorp, the major technical hurdle in the development of an electronic mail system was finding a way for users to lick the electronic stamps without catching a virus from a common carrier.

As a unique convenience, if a *PiranhaMail* memo arrives when you're not in your office, the system automatically removes the name at the bottom of the distribution list, writes your name at the top, and sends ten copies to your friends.

PiranhaMail also has a BROADCAST feature. For efficiency, it doesn't actually deliver a copy of a BROADCASTed message to every user in your department; it simply prints one copy of the message, marks it CONFIDENTIAL, and leaves it casually on the copying machine in the hall.

As an afterthought, PiranhaCorp also recognized that sending flowers by wire has been a lucrative enterprise for other telecommunications companies, but the profits are largely limited to a few mushy holidays. Consequently, in an attempt to come up with a wire service that would be less seasonal, PiranhaCorp developed a method for wiring trash directly to the landfill of your choice—thus, the so-called Piranha Electronic Junk Mail. ■

Data Access Issues: Security Vs. Openness ...

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who will be the custodians of the data, responsible for keeping it accurate and up-to-date; which pieces of data should be changed automatically by changes in other pieces of data; who will be able to see which data on a more or less routine basis; and how will exceptions be made for non-routine data access.

Single source

The question here is whether there should be a single computerized information source from which all information about prospective students, enrolled students, alumni, parents, faculty, staff, and companies is both updated and accessed throughout the entire institution. A related question is whether individuals should appear in this information source only once, regardless of the number of relationships each one has to the institution.

With a single information source in which each entity appears only once, a great deal of the usual duplication of data found on typical campuses today is eliminated. For instance, in many institutions, when the president wants to mail an announcement to both alumni and parents of current students, a person who is both an alumnus and a parent will get two announcements. It is also possible (even likely, perhaps) that the announcement could go to two different addresses if, say, an address correction or update was made in one place and not in the other. It certainly happens today that a single individual is simultaneously an alumnus, a parent, and an employee. Further, he or she could be taking a course or two as well! A single information source, with each individual record appearing only once, goes a long way toward achieving accuracy and timeliness in the institution's data.

A single source, however, does increase the institution's security risks. Storing data this way makes it easier to access the data in helpful and useful ways, but it also makes it easier to access that same data in inappropriate ways.

Custodianship

For each piece of data kept by the university, regardless of how or where it is kept, who will be designated as the custodian of that data? That is, who will be responsible for collecting that data element and then keeping it accurate and up-to-date, not only for his or her own purposes, but also for others who may need to use that data?

> *Eventually, a lot of data entry will happen by the individuals themselves on whom the data is being kept. Who, after all, has a greater stake in the accuracy and timeliness of this data?*

Responsibility for certain data elements may change over time, such as a student home address moving from the responsibility of the admissions office, then to the registrar, then to the alumni records office. In addition, more than one office may share this responsibility at any one moment; for instance, both the registrar's office and the housing office might update local addresses.

Generally, custodianship has been moving closer to the source over the years. Whereas once the norm was centralized data entry (usually keypunching), we have seen in recent years more office-based data entry through online systems. But it hasn't stopped moving yet, and eventually, a lot of data entry will happen by the individuals themselves on whom the data is being kept. We already have touch-tone registration in many places; it won't be long before we see students updating their own local addresses, admissions prospects filling out their applications directly into the Admissions system, and employees enrolling for benefits online. Who, after all, has the greatest stake in the accuracy and timeliness of the data?

Automatic changes

Not all data has to be updated directly through data entry. The institution needs to decide which, if any, data elements should be affected automatically by changes in other data elements. For instance, is it important when a student signs up for campus housing to have the housing charges automatically applied to his or her accounts receivable record? If a student withdraws from the institution, should certain data be automatically updated to reflect that fact?

Having changes to data automatically propagate throughout an entire database can help ensure both accuracy and timeliness of data, but this automation also makes it much harder to keep track of why particular data elements changed, and under which circumstances. Unless there are clear and accurate audit trails that can trace changes to data back to their source, users have no way of knowing whether a change is a legitimate one, or a result of accident, or worse, mischief.

Furthermore, some changes ought to also generate notifications to certain people alerting them to the change. A student withdrawal, for instance, is typically something that needs to be known by a lot of people in different offices (including faculty). Whether everyone is notified electronically or otherwise, a change notice, automatically generated by the change itself, should be sent.

Routine access

There is a certain amount of information that many people are going to want to access more or less routinely, even if it is not under their direct custodianship. For instance, the people in Financial Aid will want to know the admissions status of students who have applied for aid; the Registrar will want to know whether a student's bill has been paid before letting the student register; the Admissions Office people will want access to alumni addresses to match prospects with alumni.

The question that must be decided is: who will be able to see which data on a routine basis? That is, who will be granted access without having to specifically request it? These decisions are often made when new administrative systems are installed, recognizing that one of the biggest benefits of a new system is its ability to make data access relatively easy. But these decisions are not always easy to make, especially if many departments have been reluctant in the past to share "their" data.

The most common method used to determine routine access is by committee, usually an administrative users group, or, sometimes, the committee that made the original systems decision. The least desirable, and increasingly rare, way to do this is to put all of the access decisions in the hands of the computer center director.

In any case, the most important component of the decision should be the position within the institution and the tasks that go with that position. Data access should rarely, if ever, be granted to individuals; only to positions.

Specific access

Then there are the cases in which someone needs access to data for a special purpose. How will specific access to specific data be granted? An institution generally has three options here: one is to appoint a campus data administrator who will make all of these decisions. A second option is to have each decision be the purview of the custodian of the data in question. The third is to have the same committee that decided on routine access decisions make these decisions as well.

The way that seems to work best, in terms of both efficiency and politics, is to combine these methods, so that someone who needs access to certain data first requests it from the data custodian, and then uses the committee if the decision needs to be "appealed."

In summary, technology today enables a full range of data access; it is up to each institution to make sure that the right policies and procedures are in place to ensure that data access is properly limited to the legal and the ethical. ■

> **"Many educators fear that the computer will give students such powerful search and research engines that faculty will become redundant. Just as the printing press freed teaching to move to a higher level of conceptualization, so, too, will education in the information age transcend what has been common in our time. Good teachers will not be replaced by teaching assistants and teachers' aides, but they will be freed to define education in more exciting and creative terms."**

Norman Coombs
Rochester Institute of Technology
"Teaching in the Information Age"
EDUCOM Review
Mar/Apr 1992

In Future Issues

- *The destructive power of the blame-the-user syndrome*
- *Round table: campus computing in the year 2000*
- *Ten steps to building a top-notch computer services department*

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EDUTECH RESPONDS

Q. I have been asked to serve on the policy committee for university computer services, but as the provost for our undergraduate colleges, frankly, I don't feel qualified at this point to serve in this capacity. I haven't had any real hands-on experience with computers, and I find most of the jargon incomprehensible. Is there some quick way I can get educated in this area?

A. *Your concern is understandable, but you are probably worrying more than you need to. Most likely you were asked to be a member of this committee not for your technical expertise, but rather for your perspective on the institution itself. You don't need to have had hands-on experience with computers to serve on a policy committee; what you do need is an understanding of the ways in which technology could be serving your institution. That requires being in touch with the issues surrounding information technology: its potential, its costs, and its impact. It is the vision of technology, much more than the application itself, that makes a policy committee especially useful and important. Some suggestions: read* The Best of CAUSE/EFFECT 1978-1991 *(Available from CAUSE: (303) 449-4430) and* Organizing and Managing Information Resources on Campus *(Available from EDUCOM: (202) 872-4200) to begin with. Also, have a chat with the head of computing on your campus for an overview of what's going on; if you hear any jargon in that discussion, keep requesting that it be eliminated, until it is.*

Q. Our philosophy in computer services has always been to serve as many people as possible. Everything we do, from applications programming to staffing the micro labs, is directed towards helping the greatest number of people. The problem is that there are just too many people who need help, and we are always stretched too thin. How can we get more resources?

A. *These days, you probably can't. There are two options you could consider: helping all users more efficiently so you use less resources, and changing your philosophy so that you channel more of your support to those users whose leverage will most benefit the institution. For all users, there is more support available today (packaged software, videotaped training, less costly micros, etc.) that takes some pressure off the computer center. For targeted users, the benefit to the institution is more likely to outweigh the cost of their support.*

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The Education Technology Newsletter for Faculty and Administrators

Creation of an Information Infrastructure

By John D. Hoh
American International College

Computing and information technology has been greatly hampered in making a major contribution to higher education. Even with its enormous potential, current considerations, including the reliability and capacity limitations of existing wiring schemes, the lack of expansion capabilities in many of the functional areas, over-reliance on the services provided by a centralized computing services environment, and the inability to facilitate non-text graphical applications have all contributed to the problem. In order to make genuine progress, both the current situation and future needs require higher education to embark on an ambitious project: the creation of an information infrastructure.

Goals of the information infrastructure

Several goals and objectives need to be planned for in creating this new information infrastructure for higher education. The first goal is to create a single (at least from the user's point of view) robust, fault-resistent, and flexible networking infrastructure that supports a heterogeneous computing and technology environment. In addition to being both hardware-independent and software-independent, the infrastructure must combine a variety of media, such as coaxial cable, copper pairs, and fiber in order to link offices, dormitory rooms, instructional labs, library resources, external information sources, and all of the institution's computing facilities.

Second, the networking environment has to have sufficient capacity for both future growth and emerging technologies. This capacity must be available, or be able to be added easily and relatively inexpensively, in several areas, such as the number of access points and bandwidth.

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"Helping students become information literate is not the same as teaching them library or bibliographic skills.... A more systematic effort is needed to integrate information resources and technologies into the heart of the curriculum at all institutions. Without an all-out effort, there will continue to be students graduating from liberal arts programs never having used an index, much less an on-line database."

Patricia Senn Breivik
Towson State University
''Information Literacy: An
Agenda for Lifelong Learning''
AAHE Bulletin
March 1992

NEWSBRIEFS

LEAGUE FOR INNOVATION ANNUAL CONFERENCE

The theme of the 1992 annual conference of the League for Innovation in the Community College is "Content and Connection: People Using Information Technology in Community Colleges." It will be held this year on October 21–24 in Orlando, Florida, and will be hosted by Santa Fe Community College and Valencia Community College.

Topics will include multimedia in instruction and student services; distance learning and remote access to resources; serving students with disabilities, underprepared students, and older adults; changing organizational structures and processes; preparing faculty, students, and staff for new roles; and developing partnerships for technology implementation. For more information, contact the League for Innovation Computer Conference, 25431 Cabot Road, Suite 204, Laguna Hills, California 92653; (714) 855-0710.

BINATIONAL NETWORKING

BESTNET, the Binational English and Spanish Telecommunications Network project, administered by San Diego State University, has received a donation of $250,000 in computer hardware and software from Digital Equipment Corporation. The project was set up to explore ways that technology can change the process of education and create new learning communities that cross institutional boundaries.

According to Digital, the donation includes computers, terminals, associated equipment, and software. It was given to enable the universities participating in the project "to conduct significant research in computer communication and applications in higher education and multi-institutional information management."

CHARTING THE COURSE AT EDUCOM '92

Preparations are now underway for EDUCOM's annual fall conference on information technology in higher education. Hosted by the Johns Hopkins University, the conference is scheduled for October 28–31 in Baltimore, Maryland. Scheduled speakers include Kenneth Olsen, President of Digital Equipment Corporation, and Seymour Papert, well known for his work in advancing the field of educational technology, and winner of EDUCOM's 1991 Louis Robinson Award.

The theme this year is "Charting Our Course: Setting a National Agenda for Information Technology and Higher Education." Sessions will target four areas critical to setting a national agenda: inter- and intra-institutional organization and change, teaching and learning, access to resources for learning and research, and new scholarship and the changing nature of information. For more information, contact EDUCOM, 1112 16th Street, N.W., Suite 600, Washington, DC 20036; (202) 872-4200.

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The Trends That Challenge Us

An advertisement put out recently by CAUSE for one of its publications summed up very well what most information technology professionals have lived through in the last decade or so: mainframes to minis to micros; batch processing to interactive to client-server; centralized to decentralized and back again; data processing to networked information; computer center to LAN to WAN.

Exciting, to be sure, but also hectic and challenging. And of course, the changes are still going on as rapidly as ever, and not just in the technology itself, but also in the ways in which both academic and administrative users want to deal with data and information. What are some of the challenges campus technology professionals will be facing this decade? Some of the most important ones are here; responding appropriately to these trends while still maintaining stability is going to be the cornerstone of the 1990s.

Eventual disappearance of centralized, mainframe-based computing in favor of more user-oriented architectures. As the price/performance of smaller computers continues to improve, as it has been doing at a very rapid pace in recent years, there will be fewer mainframes handling the kind of work that mainframes handle today, and less dependency on large, staff-dependent, maintenance-hungry hardware kept in special environments. Both data and data processing are quickly moving out from large centralized sources to smaller, cheaper, increasingly powerful configurations, located closer to the users themselves. It is no longer a question of whether mainframe computing will disappear, but when.

More people wanting access to more information, regardless of where or how it is stored, including remotely. As more information is made accessible electronically, and as electronic transmission becomes both more reliable and faster, it will become less important where information is located, and more important to provide the means to get at it.

More user control, more desire to do things themselves. Users in general are becoming increasingly sophisticated in their computing, and more conscious than ever of the possibilities offered by technology. Along with this increasing awareness is a desire to shape their own computing environments to accommodate personal work habits, and their own ideas on ways in which technology can improve productivity. Whereas once users relied on computing professionals to supply the answers, increasingly, users want to do their own computing, in their own way.

> *Bringing automation to the established way of doing things has some benefit, but reengineering the organization itself is where the real benefits of technology will emerge.*

More purchased systems, less developed in-house. The world of commercial software is rapidly improving, and becoming not only more widely functional, "user-friendly," easier to learn, and better documented, but also more accommodating of idiosyncracies. It is much more likely today than ever before that a commercial, packaged, tested, and proven solution for many of the institution's information processing and courseware needs can be found. It is becoming increasingly apparent that a package that meets even just a portion of information and processing needs is likely to be a more cost-effective solution than developing and programming the same capabilities in-house.

Change in focus from development to user support. At the same time as the need to develop software in-house decreases, the need to support users in other ways is increasing. Users typically need a great deal of support in making the transition to doing more of their own computing from having someone do it for them, and need to be able to rely, at least for a time, on knowledgeable and experienced staff to help guide the way.

Universal connectivity. Eventually, all electronic devices will have some kind of communications capability, and all devices that can communicate will communicate. It is the responsibility of central computer services organizations to make sure the communications highway that will enable this is in place and fully reliable.

The need for reengineering both in computing and in the institution as a whole. As technology continues to permeate our educational institutions, it is becoming clear that in order to maximize the typically large investment in hardware, software, communications, and staff, a reformulation of the ways in which tasks are accomplished, as well as the overall goals to be reached (not by technology necessarily, but by the institution itself) is necessary. Bringing automation to the established way of doing things has benefit, but reengineering the organization itself is where the real benefits of technology will emerge. ■

Creation of an Information Infrastructure ...

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The third goal is to extend the network beyond the confines of the main campus and to remove the usual constraints of time and geographic proximity to the process of information access, retrieval, and analysis.

Fourth, the infrastructure has to bring the full complement of computer, communication, library, and information services to each desktop. In order to facilitate and support this idea, the academic community must be made aware of the many benefits of an information-rich environment.

The fifth goal is to create an environment in which scarce and expensive resources, such as laser printers, FAX services, CD-ROM servers, application software, and connections to outside services, may be shared.

And finally, the infrastructure must create an environment that "democratizes" the use of information services. Users should have access to services without the burden of excessive costs and should not have limitations imposed on them due to physical challenges or handicaps.

Consequences of the implementation

An information infrastructure will impact in major, important, and positive ways on higher education.

Empowerment: Academe will benefit from the decentralization of responsibility. A computing environment that supports data acquisition, graphical and quantitative analysis, and literature searches all through the network will empower the end user. It will give the individual and the department the tools to query appropriate information sources and produce timely and accurate reports without the assistance of a centralized computer service.

Ability to facilitate emerging technologies: A properly designed information infrastructure will have limitless expansion capabilities. This will allow institutions to add users and services when appropriate, as well as being able to access and utilize new technologies, such as video conferencing, EDI, ISDN, and FAX services, when they become cost effective.

> *Many faculty are now realizing that the most time-honored and powerful learning format—the seminar—can be delivered through technology, free of the constraints of time and space.*

Collaboration and scholarly communication: The communication between students and teachers as well as the scholarly exchange between and among colleagues will inevitably rely more frequently on the use of digital technologies. Many college and university faculty are now realizing that the most time-honored and powerful learning format—the seminar—can be delivered through technology, free of the constraints of time and space. Using technology for seminars and conferencing creates an ideal meeting place that is "virtual."

Communication between scholars often revolves around research. Current research is often done collaboratively through networks. The network has become the "collaboratory" for researchers and authors from different institutions. The emergence of new network capabilities will allow the education and research community to access not only each other, but diverse technical environments and information resources as well.

Scholarly needs will be fulfilled in a manner that eventually will be far superior to the traditional dissemination method of paper journals. These "electronic papers" will be categorized and cross-referenced with other relevant works. This will provide important links among the disciplines. The end result will be to achieve one of the fundamental aims of higher education: the expansion and enhancement of scholarly communication.

Engage users: The primary purpose of higher education is to create and disseminate knowledge. Traditionally this dissemination process was based upon a textbook/lecture method which stressed the rote delivery and ingestion of facts and theories. Nobel Laureate Herbert Simon refers to this model of learning as the "infection theory" of learning. Interestingly, this method is in direct contrast to models put forth by two of our most famous educators and philosophers: Dewey and Locke.

Dewey was mainly concerned with leading the learner, through his or her own spontaneous impulses and interests, to achieve growth through participation and reflection. Similarly, Locke's method of education was one that encouraged initiative, independent judgment, observation, and critical use of reason.

John Hoh is the director of computing and communications services at the American International College in Springfield, Massachusetts.

The textbook/lecture approach fails to involve the student, does not accommodate the existence of information in multiple forms, and fails to employ "electronic tools" to gather and manipulate data into information and knowledge. On the other hand, the classroom can be a place where the instructional process effectively integrates the human element with technology through the use of tools such as powerful workstations, communication networks, and a variety of audio-visual media.

Technology allows students to move away from the passive reception of information to the active engagement in the construction of knowledge. Through technology, students become better equipped to apply their new knowledge to real-world situations and contexts.

Technology also expands our ability to express, understand, and use ideas in a multitude of symbol systems. In compound documents, symbolic expressions involving digitized media, sounds, graphics, and text can be presented all on the same display.

Brian Hawkins of Brown University (winner of the 1991 CAUSE *ELITE* Award) has visualized that the focus of a progressive information strategy will be to provide an easy-to-use access method to all information resources, thus enabling faculty and students to employ information technology to the degree that it facilitates their own scholarly and educational goals.

Knowledge management: Technological innovations have further blurred the distinction among the traditional roles of libraries, computer centers, and academic departments. As a result, libraries will be under increasing pressure to provide access to information in electronic form and to integrate their services with other aspects of academic and scholarly life.

Libraries historically have been identified with the functions of storage and retrieval. In an article in *The EDUCOM Review* in the Fall of 1990, Richard Lucier used the term "knowledge management" to mean organizing concepts that give information structure, and he concluded that we are moving towards it rapidly. This is a move beyond simply replacing or automating what is currently being done. Knowledge management involves an innovative transformation of how we work in the academic community.

> *The classroom can be a place where the instructional process effectively integrates the human element with technology through the use of tools such as powerful workstations and communication networks.*

Others have described the ideal electronic library not as a single entity where everything is stored but rather as a range of services and collections made accessible through networks that reach beyond individual campuses or research laboratories.

In another *EDUCOM Review*, Winter 1990, in an article entitled, "Implementing the Vision: A Framework and Agenda for Investing in Academic Computing," Richard West and Richard Katz detailed the evolution of information environments. Four key areas are currently under transition. First, academic information resources have evolved from being available through books, journals, archives, and physical storage in the library to being available electronically and free of geographic bias via multimedia workstations.

Second, the tools of research are no longer just card catalogs, bibliographies, and indexes located in the library. Expert system front-ends for indexing, browsing, and retrieval are being incorporated rapidly into the tools set for researchers.

Third, document delivery will shift from acquisition based on library and interlibrary loans to print-on-demand delivery at the workstation. We are already beginning to see some of this.

Finally, user support traditionally handled by the librarian, archivist, and curator will evolve into support by information management professionals.

The challenge

With things changing as rapidly as they are, it is easily to lose sight of the larger, intangible issues having to do with ethical computing.

A college or university is, at any given time, a user and a creator of information. Higher education must recognize that it has a responsibility to educate all those in the community as to what is appropriate, ethical, and legal behavior. Academia, in conjunction with other interested parties, should address a number of issues relating to society's needs in the age of information. Only higher education has the combination of interest, resources, and the serious concern for what is ethically and morally correct. It must take the lead in dealing with issues relating to "correct" computing. ■

What It Takes To Be A CIO

In the increasing number of institutions creating and filling the Chief Information Officer (CIO) position, it seems all too often that the person chosen to fill the new slot is not the incumbent computer center director. Even though logic suggests that the CIO position is the next step on a computer professional's career path, when it comes time to choose a CIO, many colleges and universities look to the outside. Why?

Of course, we have all heard the advice about leadership, vision, and the need to have a proactive attitude. But these are vague, hard to define traits; what we need are the specific abilities that will measurably enhance a computer center director's chances for taking the next step and becoming a CIO.

Since the most efficient way to figure out what's needed is to ask the ones who are already there, that is what we did. In an informal, very unscientific survey, we asked several current CIOs what it takes to get where they are. This is what we learned.

The ability to see things from different perspectives. Most computer center directors have been technical people during their careers, perhaps for a lengthy period of time; now that they are managing, it is very difficult for some of them to let go of the technical perspective. Many former programmers miss the technical challenges and rewards. Programming produces results; it is logical, organized, and lends itself well to straightforward problem-solving. On the other hand, managing is mostly dealing with other people: messy, illogical, emotional, and a seemingly endless series of problems. In addition, coming "up through the ranks" and perhaps feeling some disdain for one's non-technical bosses (not to mention the users) also colors the perspective of some directors. It is not a coincidence that the majority of CIOs today have never been programmers.

But one of the most important talents of a college administrator is his or her ability to be empathetic, to see the world through the eyes of others on campus. To ascribe attributes to situations which are not necessarily from only a single point of view (and to be non-judgmental about it) is a critically important ability for advancement. How does this problem look to the user? How does this situation seem to the faculty? What is the president likely to think about this? Being able to answer these questions without cynicism and without thinking that the other people are crazy or dumb definitely enhances one's career opportunities in administration.

> ***While good communications skills are important in any environment, in higher education, they are right up there at the top of the requirements list.***

Empathy requires two vitally important skills: listening and withholding quick judgements. Does this mean the computer center director should not have strong opinions about things? No, but it does mean that those opinions need to reflect broader perspectives than just the director's own.

The ability to get people to do things they don't want to do. There is still an enormous amount about technology that non-technical people do not understand. This is also likely to be the case well into the future, as the technology continues to move rapidly. More than anything else, it is this lack of understanding that makes people fearful about getting involved with technology, and once involved, obstinate about doing certain things, such as following standards for hardware and software purchases, taking backups routinely, or having the information technology policy committee meet more than once a year. It isn't that the president doesn't want to build new computer facilities and hire more computer people, it's that she doesn't understand why it has to cost so much.

The art of persuasion is what is needed here. And the artistic basis for persuasion is excellent communications skills, both in writing and in talking. While good communications skills are important in any environment, in higher education, they are right up there at the top of the requirements list. The vocabulary, the grammar, the diction, and the ability to make a reasoned verbal argument have to be on an absolute par with everyone else's in this highly intelligent and educated community. If the computer center director's are not, the task of convincing, cajoling, and persuading, all necessary to get campus people to buy into technology and its proper usage, will be enormously difficult. And the computer center director will not be seen as a candidate for the CIO position.

The ability to not "take sides" between the computer people and the users. There are still plenty of institutions that have an us-versus-them battle going on between the computer center and its users. Even when the battle is not overt, the sense is often that there are sides, and every person on campus is clearly on one side or another. Not taking sides in these situations is extremely difficult, especially when the computer center director is, in a sense, caught in the middle. But it is also extremely important in maintaining the relationships that need to be in place for the future.

Working with the computer center staff to help them understand that the users are not the enemy, and working with the users to improve their capacity to deal with computer people are better strategies than constantly being defensive.

An understanding of the mission and culture of the institution, and an appreciation for the goals of higher education in general. The further up one gets on the career ladder, the more important it is to be acculturated into one's working society. A computer center director who acts as though this were a business like any other, who manages the computer center without sensitivity to the things that make higher education different: the role of the faculty, the decision-making process, the number of campus committees, and so on, is surely not going to be seen as one who can fit into a higher place in the institution. It may be corny, but it's also true that higher education is a noble enterprise, and one's attitude toward it will make a difference.

The ability to build a team. No one works alone, especially in an environment that is characterized by collegiality. The computer center director needs to know how to build a team within the computer center, with users for projects, and with other faculty and administrators for policy committee work. Team building requires getting people who may have entirely different roles and purposes to work together for a common objective; not easy, but very rewarding.

Enough of an understanding about the technology to know right from wrong. Of course, that's quite a lot, but it's also less than most computer center directors know. Illogical on the surface perhaps, but not when one considers the fact that a CIO is a college administrator first and a technologist second. Knowing about the potential of technology, having the vision and the imagination to know what's possible, as well as an understanding of the costs and benefits are the important needs, more than knowing how to program or how to rerun a production job. Does this mean that what a computer center director knows is useless in becoming a CIO? Not at all; it just means that he or she needs to put that all together into a broader perspective. ■

"Electronic classrooms are blossoming across the academic landscape, the result of crossbreeding computer technology with pedagogy. But are we employing the microcomputers in our electronic environments as fancy typewriters, or are we using them to reveal word processing's potential to our students? The challenge is to design assignments that serve as sound writing exercises, while employing the special abilities word processing technology offers. In an academic world of increasingly scarce resources, if we can't design such exercises we must question whether expenditures for electronic classrooms are necessary."

Edward Klonoski
University of Hartford
"Recycled Writing: The Macro Function of Word Processing"
Collegiate Microcomputer
February 1992

In Future Issues

- *Round table: campus computing in the year 2000*
- *Ten steps to building a top-notch computer services department*
- *The destructive power of the blame-the-user syndrome*

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EDUTECH RESPONDS

Q. For the first time, I need to put together a strategic plan for information technology at our college, and I really don't know where to start. The only planning I've done in the past has been putting together our annual budget.

A. *You could start by acquiring the strategic plans that have been submitted to the CAUSE exchange library (contact them at (303) 449-4430) just to give you an idea of what strategic plans look like and an outline to follow. These are some basic guidelines: think of a three-year planning horizon; longer than that is just guesswork. Through both formal and informal discussions, ask as many people on campus as possible what they think ought to be in it; don't try to create this all on your own. Keep it short, keep jargon out of it, stay as specific as you can, and focus on the primary, large benefits that information technology brings to your campus. And keep in mind that it is the planning process, more than the plan itself, that is really valuable: the discussions with current and potential users, the thinking in future terms of costs and benefits, the several iterations the document will go through before it is finished. Even with all of the work, you can take satisfaction from the fact that you will be creating both a process and an invaluable guide for your institution.*

Q. We have been working on a systems project with the accounts payable department for two years now, and we can't seem to bring it to a successful conclusion. We leave test material for them to look at, and they say they're too busy. We give them guidelines on how to run this new system in parallel with their old one, and they say it's too much work. We want to meet with them regularly, and they keep postponing the meetings. How can we get them to work with us?

A. *Whose idea was it to do this project in the first place? Either there are reasons for it being completed that make sense to the users, or there are not. If not, give it up, and wait until they are ready. If the initiative for new systems and projects doesn't come from the users, or if they don't see enough benefit in the potential results to be willing and eager participants, and even to take a leadership role, there's no sense in even beginning a systems project. You would be better off working on something that has greater value.*

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Enterprise-Wide Computing: A Vision Takes Shape

Picture this: A junior who recently transferred to a four-year college from a local community college is meeting with her advisor to discuss her course load for the coming semester. Her advisor begins the session by displaying the student's transcript on a desktop computer. Next the advisor uses the computer to search the university's online course catalog for course requirements for the student's declared major and for regulations pertaining to transferring credits from two-year institutions. Once they have looked over the requirements and transfer regulations and agree on a course load, the student leaves her advisor's office and goes to the library, where she uses a desktop computer to register for next semester's classes and to add her local address to the student information system. Her advisor, meanwhile, uses her computer to review the transcript of the next student she is scheduled to advise.

Or this: A dean of academic research has been asked by the board of trustees to analyze the relationship between the engineering faculty's salaries and the research grants they have obtained. To do this, she uses a spreadsheet program on her desktop computer to access relevant data from both the university's academic personnel system and the engineering school's research database. She then uses the spreadsheet program to analyze and graph the data. The dean then creates a final report, complete with charts and graphs, which she sends by electronic mail to each trustee.

Or this: A senior chemistry major is seated at his dorm room desk prepared to start the evening's studies. He begins by turning on his desktop computer and opening an electronic folder that contains correspondence between himself and his chemistry professor. This evening, the student finds his professor's comments about his thesis proposal.

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> **"Today, one of the main ways of spending 'too much time' on teaching is to spend time designing and developing educational computer programs and exploring the use of such programs in the classroom. For many who attempt to use the computer for education, the conflict between the desire to assist students in learning and the desire to promote oneself professionally is all too clear. Educational computing thus lies at the center of many debates about teaching versus research."**
>
> Robert J. Cavalier
> Carnegie Mellon University
> "Shifting Paradigms in Higher Education and Educational Computing"
> *EDUCOM Review*
> May/June 1992

NEWSBRIEFS

SCT ACQUIRES INFORMATION ASSOCIATES

Systems & Computer Technology Corporation (SCT), a leading supplier of higher education administrative software is in the process of acquiring one of its major competitors. SCT has announced an agreement with Dun & Bradstreet Software (D&B Software) to purchase D&B's subsidiary, Information Associates.

Long-time rivals in providing higher education software, SCT and IA will now combine their resources and market shares to become a major force in the college and university software marketplace. Each company produces complete suites of administrative software running on a variety of hardware platforms; how the software products will change as a result of this purchase has yet to be determined.

DESKTOP COMPUTING SURVEY AVAILABLE

The *1991 EDUCOM•USC National Survey of Desktop Computing in Higher Education* is based on responses from more than 1,000 two- and four-year public and private colleges and universities. The survey was conducted by the University of Southern California's Center for Scholarly Technology during the spring and summer of 1991, and builds on a survey from the previous year. Responses give information on academic computing budgets, strategies for coping with reduced budgets, specific vendor and system percentages, microcomputer operating system preferences, resale programs, student versus institutional ownership of computers, support for faculty in developing courseware, and organizational issues.

Many of the data items were compared with responses to the 1990 survey, and show clearly the effect in many areas of technology budget cuts. The survey report is available for $30.00 from the USC Center for Scholarly Technology, University of Southern California, Doheny Memorial Library, Los Angeles, CA 90089.

COMPUTER LITERACY COURSE NOW CONSIDERED REMEDIAL

The College of Business Administration at the University of Nebraska at Lincoln has declared that so many of its entering students are already so proficient with computing that a basic course in personal computing will now be offered as remedial—in other words, not for credit.

In order to demonstrate proficiency, entering students will need to score well on an exam that tests database usage, familiarity with spreadsheet software, and word processing knowledge. If they fail the exam, students may either take the basic course for no credit, or use a self-paced instruction program through the university's computer center.

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Changing the Way We Do Business

by Barbara Ross

***Note:** While many colleges and universities have made the switch to fully integrated on-line administrative information systems, many more have yet to do so. For those still contemplating the change, it may be difficult to imagine some of the actual impact on day-to-day life that a new system will have. This article, written by a user, describes the impact of a new system with an integrated database.*

The Good News

The bottom line is that the new system has increased and improved the service to students. For one thing, there is less shuffling of students from office to office to find out the answer to a problem because access to information is much more widespread. In addition, the quality of the information is better.

A change in data in one module shows up in other modules. For example, a new registration transaction leads to an immediate recalculation of tuition and a change in the financial aid module. A student can now be admitted and registered in a matter of five minutes as opposed to having to wait overnight for a batch program to run.

Data, such as name changes, address updates, and so on, only need to be entered once. In the past, it was often necessary to update the same information in several modules, either manually or in batch. Having to do it only once eliminates the possibility of it being corrected in one file but wrong in another.

Another advantage to the student is that users have a much better understanding of the procedures used in other offices because everyone is so interdependent now. It benefits a student when a staff member has a broader base of knowledge. On the other hand, students now expect staff to answer a greater number of questions; a common comment from students is, "Why can't you pull up that screen?"

One of the greatest advantages is that users don't have to log in and out of different systems for different kinds of information. In addition, there is a huge amount of new information available. In fact, we subscribe to the Potato Chip Theory of Information: you can't eat just one. When users see the amount of information contained in an integrated database, they want more and more of it.

> *The bottom line is that the new system has increased and improved service to students.*

System Impacts

Many batch programs that used to run every night can now run only on the weekends due to long run times. Much of this is related to either the size of the database, the competition for each module to run its batch job using the same database, or the complexity of the programs.

Many batch jobs that could run concurrently in the past because they were using separate databases or files now either create contention problems or must be run in the proper sequence to work effectively. Scheduling of critical processing, such as that which occurs immediately before a semester begins, requires that all affected areas get together to establish data and processing dependencies and flow diagrams. Without this, there is no way to ensure that all of the work will get done, as well as done in the proper sequence.

Another difference is that what looks like a simple system modification may require changes in other modules now. This simple change can proliferate greatly, increasing the amount of work to be done. In addition, all users must now review and approve all modifications to any module in the system. There also needs to be a system manager who can review and coordinate all modifications.

With an integrated database, you have a large number of users accessing one database at the same time (as opposed to many users accessing different databases in separate systems), creating a much greater dependency on the system. In addition, too many users on the system at the same time can lead to poor response time or overloading and losing the system for periods of time.

Due to its size and complexity, the new system has created a great increase in workload for everyone, including both users and systems people. The extra workload is from having to manage the data, to secure and monitor changes of data, to fix bugs in one module complicated by the need to evaluate the impact on other modules, to make additional enhancements, to program more reports, and to troubleshoot. ■

Barbara Ross is in the Registrar's Office at the University of Colorado, Boulder. This article is based on part of a paper she delivered at this year's AACRAO conference.

Enterprise-Wide Computing: A Vision Takes Shape ...

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Based on those comments, he uses his desktop computer to review several abstracts that are part of the university's on-line library system. He then goes on to complete his assignment for drama class, viewing video clips of portions of American and British productions of *Hamlet*.

These are not futuristic visions, but realistic scenarios that could be implemented today due to recent advances in software and networking technology that greatly facilitate communication between incompatible hardware and software.

In the scenarios described above, users—including students, faculty, and administrators—all have access to their university's *campus-wide* (also known as *enterprise-wide*) computer system, a system of networked computers that can serve thousands of users. In an enterprise system, anyone with a desktop computer has the potential to access any information stored on campus computers, from local data, such as information about a specific course or department, to global or institution-wide data. Traditionally, this kind of information has been restricted to campus mainframes and minicomputers. But now, thanks to the development of enterprise systems, universities can leverage that information so that it can be used by any member of the university community. Because users have immediate and direct access to data, they can work more productively, while minimizing the costs associated with relying on computer center personnel to access data for them.

Of course, everyone on a college campus will not need the same kind of information. In fact, it is critical that certain information be kept confidential. Thus, a critical function of an enterprise system is providing users access to appropriate information while limiting their access to other information, all based on users' interests and needs.

Focus on client/server computing

With recent advances in software and network connectivity solutions, enterprise-wide systems are increasingly based on a client/server model of computing in which a host, usually a mainframe or minicomputer, and a desktop computer share the task of processing information.

> ***An enterprise-wide system represents a leap in information sharing because it provides users with easy yet secured access to data and applications that span all of an institution's departments and disciplines.***

Many educational institutions have implemented—or are in the process of implementing—client/server applications that serve individuals in one segment of an institution's operation, such as admissions or student information. An enterprise-wide system represents a leap in information sharing, and hence user knowledge and productivity, because it provides users with easy yet secured access to data and applications that span all of an institution's departments and disciplines. Thus the dean described earlier has access to institution-wide personnel data as well as research data about her school, while the chemistry major is able to communicate with his chemistry professor as well as with the campus library system.

From an administrative perspective, the emphasis on client/server architecture provides information sharing at a lower cost. Many colleges and universities already have invested heavily in personal computers. Client/server architectures, designed to appropriately balance the load of information processing between mainframes/minicomputers and desktop computers, can greatly increase the proportion of total processing power desktop computers contribute.

How it works

When a user sits down at a desktop computer that is part of an enterprise system, he or she typically begins by providing a name and a password. Once the system has accepted the password, the desktop computer sends a message to a central database asking what kind of data that user can access. The desktop computer responds by displaying a menu of choices representing the data and applications available to the user based on the user's characteristics. For example, an enterprise system that provides on-line student transcripts would provide a student access to his or her own transcripts, an advisor with access to advisees' transcripts, and a dean with access to the transcripts of all students in the college.

Many of the applications available on an enterprise system permit users to gather information from several different data sources. But because an enterprise system operates as a single logical application with a single interface, users can gather this information using the same procedures, regardless of the kind of data they are accessing or

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the location of the data. Users also can combine data from a variety of sources in one session. Thus, as in the scenario above, the dean is able to use spreadsheet software to query both the research database and the personnel system, even though the data is stored in different formats on different computers.

Finally, with the appropriate network setup and security measures, users can even gain access to an enterprise system from remote sites. While attending a conference, a department head could use his or her portable computer to check for electronic mail; while home on spring break a student could check the online student directory for the names of classmates in the same town.

Characteristics of enterprise applications
To be effective in today's dynamic environment, systems that provide enterprise-wide information access should possess a number of important qualities. First, applications should be distributable, meaning that they can be divided into discrete functional components that run on different platforms but operate across the network as a single application. The system's overall efficiency is increased because each platform runs the software component that takes advantage of that platform's unique capabilities. Desktop computers, for example, are ideally suited for graphically displaying information while mainframes are better suited for processing massive quantities of data.

As more and more software is written for desktop computers, the proportion of total enterprise software activity occurring on desktop computers will increase. This is good news from a budgetary standpoint because it means that, rather than investing in new mainframes and minicomputers, enterprise systems will be able to rely more on existing desktop computers for an increasing number of computing tasks.

Enterprise system applications must also be shareable, meaning that they can be used by several users or other applications simultaneously, and portable, meaning that the same application can run on different platforms, thereby minimizing development and support costs.

The applications that comprise an enterprise-wide system network also should all be interconnected. As a result, a change made to one part of the system will filter through to all of the other relevant components. Thus, when a student uses a desktop computer to add his or her campus address to the student information system, the system automatically adds the address to the student's health record, transcript, and financial record as well. This built-in "intelligence" greatly reduces the manual maintenance that traditionally has been required to keep large systems up-to-date.

Because an enterprise system operates as a single logical application with a single interface, users can gather information using the same procedures, regardless of the kind of data they need or its location.

Software advances support enterprise-wide computing
During the late 1980s, it became increasingly common for faculty and staff to use their personal computers to gather information from databases on mainframe computers. This empowered individuals who previously had been shut out of direct contact with data. At the same time, however, these sessions proved to be a drain on computer resources. In fact, as a result of processing and communications bottlenecks, many large institutions experienced a huge increase in the cost of processing transactions.

In the 1990s, network connectivity is becoming pervasive, and transmission costs are plummeting. Further, new object-oriented programming languages are available that greatly facilitate software development on client/server systems. Finally, several new "off-the-shelf" database access products are now available that minimize the need to develop costly custom software. Taken as a whole, these developments mean that, for the first time, institutions now have at their disposal the requisite hardware and software tools and products to build enterprise systems.

But easier connectivity and new software technologies are only part of the equation. By far the most daunting task facing institutions seeking to implement enterprise-wide systems is integrating the current portfolio of incompatible hardware, operating systems, and applications into a cohesive and unified system, while incorporating a more human-centered approach to computing as desktop computers continue to proliferate and affect the lives of many individuals. To achieve these objectives, what is needed is an information systems architecture that provides an overall framework for building and linking applications and data to each other—a "builder's blueprint" for making sure that each hardware and software component works together as an integrated whole. ■

The Disappearing Mainframe?

by Eric Johnson

Those of us interested in text processing who started computing in the 1970s or early 1980s used mainframe computers. We maintained that mainframes were real computers and that microcomputers were toys. They might be fun for games, but microcomputers were not useful for any kind of serious computing, and they never would be—we thought. But as microcomputer speeds and capacities spiraled upward in the late 1980s, it became increasingly difficult to argue that microcomputers could not be used for significant computing. In the 1990s, it is obvious the idea that mainframes are the only genuine computers is a ridiculous conclusion.

There is a danger now, however, that we might form another conclusion, equally ridiculous. We might judge that the mainframe is a dinosaur that has no future. Some educational institutions have already dropped mainframe computing from the curriculum. Some argue that all the computing we want to do can be done on microcomputers or on networks of micros, and at a tremendous cost savings. Considering the present change in thinking, it is worthwhile to examine the comparative advantages and disadvantages of mainframes and microcomputers and to consider whether mainframes are, in fact, really on their way out.

If we take a look at only processing speed, the performance of top-end microcomputers is equal to that of some mainframes. Some processors found in micros are capable of executing several millions of instructions per second, about the speed of some mid-range mainframes. Manufacturers claim that microprocessors will soon reach speeds as high as one hundred million instructions per second. Of course, mainframe processors are also getting faster. Speeds of one billion instructions per second have been reported.

The issue of processor speed is complicated by machines with multiple processors. Both mainframes and micros have been developed with parallel processors: "highly parallel" or "massively parallel" architectures employ as many as 64,000 processors. In any case, raw processing speed is usually not the most critical measure of usefulness of a computer.

> *Mainframe computers are expensive to purchase and operate, and many people would like to eliminate them if possible.*

Despite the proliferation of on-line computing, many mainframe computers are still used for large-volume batch processing, producing much of what is thought of as computer output: inventories, bank statements, student transcripts, and so on. For batch processing, the operations of the peripherals (especially disk drives and printers) are more important than raw processing speed. The quick, reliable operation of mainframe peripherals is major league, whereas similar processing with microcomputer equivalents is barely sand-lot level.

Supposedly, similar technology exists for both mainframe and microcomputer peripherals. In theory, the technology is the same, and some of it is not especially recent. In practice, the results are not the same. For example, when a program runs on a mainframe that requires more memory than the machine has, and if everything is set up correctly, data or program code will be swapped from real memory to virtual memory on disk, and then swapped back in again as needed. The speed is such that the user will hardly notice any slowing of operation.

I used what I thought was similar technology to create and use virtual memory on disk on a microcomputer. The machine had eight megabytes of real memory; the program I executed required sixteen megs of memory to run. As the program ran, it filled the eight megs in about five minutes and started to swap pages of memory to the hard disk. The light that indicates disk activity flickered, then stayed on continuously. The program ran for about twelve hours until I forced it to quit. I calculated how long the program would have continued to run had I not stopped it; about a month!

Obviously, my microcomputer was thrashing badly, and therefore, doing very little useful work. A friend who writes compilers for a living offered to rewrite my program; probably the program could have been constructed so that it would work better than it had.

The point, however, is that my implementation ran on a mainframe with about the same amount of

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Eric Johnson is a professor of English and Dean of the College of Liberal Arts at Dakota State University. A version of this article originally appeared in the May 1992 issue of Text Technology under the title "Mainframes and Microcomputers."

memory without any trouble. The technology of mainframes is simply better. It made whatever adjustments were necessary to do the processing I wanted done, rather than forcing me to adapt my program to the computer. Another advantage to mainframe processing is the speed and assurance of mainframe data backups. Mainframe backup (and restoration, when needed) is so routine, certain, and accurate, that a disk crash is more of an inconvenience than a disaster. Ask microcomputer users who have had a disk crash whether "inconvenience" is the word they would use.

Mainframes have truly massive data storage capacities. Hundreds or thousands of gigabytes of storage can be available, and it can be accessed quickly. A single mainframe disk drive might hold a thousand novels, and it can transfer data at a rate of about one novel a second. In addition, mainframes can be used by many users at many locations to communicate throughout the world.

The combination of massive storage capacity and rapid multi-user communication ability may make mainframes the most common media of storage and distribution of large text corpora in the future. Mainframes also allow a number of people to use the same computer. They can run one another's programs at the same time and on the same processor; users can access the same files; and it is easy to compare files. Users of a mainframe can be in the same room or on different continents. In short, it is the ideal environment for a team approach to computing.

By definition, a mainframe computer is a multi-tasking, multi-user machine that has extensive shared storage that can be rapidly accessed, processed, and printed; it has sophisticated communications capabilities. It is a very valuable kind of computer, plainly too useful to disappear anytime soon. They certainly will not be replaced by microcomputers simply because micros can perform minimal instruction loops rapidly. Local area networks of micros can communicate with one another and with mainframes and be very effective, but they are not substitutes for mainframes.

Mainframe computers are expensive to purchase and operate, and many people would like to eliminate them if possible. However, it appears that mainframes are still the best machines for substantial large-scale computing for both business and research. New kinds of mainframes will be, and are being, developed, and new products will ensure that they remain important components of modern technology. ■

"If it is our wish to create an environment in which faculty will apply technology to their teaching and scholarly work, then it is our responsibility to ensure that faculty are aware of technological opportunities, have access to a variety of hardware and software, and are provided support to assist them in learning to use the technology productively over a wide range of functions. In a supportive environment, the fourth stage—application—will come as a natural result of the first three, and will be initiated primarily by the faculty member."

Doan Modianos and Joel Hartman
Bradley University
"Computing in the Curriculum: A Case Study"
Collegiate Microcomputer
November 1991

In Future Issues

- *BESTNET: A study in educational change through technology*
- *Applying TQM to the campus computer services department*
- *Response to the Dean's Dilemma: a user versus the computer center*

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EDUTECH RESPONDS

Q. Academic and administrative computing at our college report to two different people at the vice-president level, the provost and the financial vice president, respectively. The president and his executive staff are beginning to see the wisdom of combining the two areas, but there doesn't seem to be a good way to do this within the current organization, and creating a new vice president position is out of the question. What are other colleges doing?

A. *While there is no precise model for this in higher education yet, most colleges and universities go about this in one of three ways. They either create a new vice presidency, reporting to the president, responsible for leadership and oversight of all aspects of information technology, both administrative and academic; or they establish this new responsibility as a formal, well-defined part of an existing vice president's function; or they create an assistant / associate vice presidency or executive directorship, to which all of the current operational computing functions report. The advantage of the third option is that it is usually easier to either create a new position or to rearrange responsibilities at a less visible level than vice president. Regardless of which option is chosen, the principal characteristics of this new responsibility are these: responding to the needs of the whole community of users and potential users, both administrative and academic, through listening, coordinating, and planning; and leading the college to a sensible, cost-effective vision for computing.*

Q. Can a computer center director ever be elevated to the position of chief information officer at his or her own institution?

A. *It has happened, of course, but frankly, it seems rare enough to be noteworthy. Unfortunately, the most common series of events leading up to establishing a CIO position is characterized by frustration, consternation, and even bewilderment about computing on the part of the rest of the institution. Too often, the administration and the faculty see the computer center director as part of the problem, rather than as part of the solution. An increasingly common way for them to fix the problem is to create a new position to which the current computer center director will report. The major issues are credibility and leadership.*

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THE EDUTECH REPORT

The Education Technology Newsletter for Faculty and Administrators

Educational Change Through Technology

When budgets are tight and when campus decision-makers have to be persuaded to undertake new initiatives, it often falls upon the shoulders of the computer people to justify spending resources on information technology. Unfortunately, it isn't always easy to articulate the benefits of technology projects, especially in terms that make sense to non-computer people. Every once in a while, however, a technology project comes along, the benefits of which are so clear and undeniable that it serves as a model for others.

"Imagine African students taking a science course from a U.S. professor without ever entering a classroom. Instead, they use videotapes and on-line assignments, dialogues, and testing. Consider a Mexican professor teaching cross-cultural understanding by having students from different countries talk back and forth on their computers. Now envision American researchers simultaneously monitoring these computer-based courses, in order to analyze cross-cultural electronic communication styles." This is the vision of BESTNET, an evolving research project using telecommunications and related technologies.

BESTNET stands for the Binational English and Spanish Telecommunications Network, and was created in 1985 by Dr. Beryl Bellman of California State University, Los Angeles and Dr. Armando Arias, Jr. of Texas A&I University with grants from many sources, including Digital Equipment Corporation. The purpose of the project is to conduct research on the higher education applications of computer conferencing, electronic mail, videotext, and related technologies in the areas of instruction, inter-institutional cooperation, research, institutional service, and administration. Among other things, BESTNET is currently using electronic networks and software to conduct courses and encourage cross-cultural communications through computer conferencing.

continued on page 3

"Eventually, some concrete response to demands from students and faculty for a more highly sophisticated information environment will be necessary on every campus. Leadership in the articulation of campus priorities, innovation in the development of demonstration projects, and long-term strategic relocations of resources from various sources will be required if the vision of the future is to be more than a mirage."

The Research Libraries Group
"Executive Summary"
Preferred Futures for Libraries: A Summary of Six Workshops With University Provosts and Library Directors
November 1991

NEWSBRIEFS

COLUMBUS STATE TESTS NEW PROGRAM FOR DEAF STUDENTS

Columbus State Community College is assisting students who are deaf by introducing the use of "real-time captioning" in the college classroom. This new method of accessing classroom lectures provides students with a court reporter instead of the traditional sign language interpreter. The court reporter records lectures with the recorded words appearing on the screen of a desktop computer provided to the student. A small window in the screen allows the student to participate in class discussions or formulate questions for the instructor. The student is also given a written transcript of the lecture.

All services to introduce the program have been donated by Professional Reporters Inc., whom the college plans to work through if funding becomes available to extend the experimental program. For more information, contact Seana Elam at Columbus State Community College, 550 East Spring Street, P.O. Box 1609, Columbus, Ohio 43216; (614) 227-2412.

REPORT ON OWNERSHIP AND COPYRIGHTS AVAILABLE

A new government report, "Finding a Balance: Computer Software, Intellectual Property, and the Challenge of Technological Change," issued by the Congressional Office of Technology Assessment, is now available. The report discusses the ownership and copyright of electronic information. To order the $11 report, contact the Superintendent of Documents, U.S. Government Printing Office, Washington DC 20402; (202) 783-3238. The order number is 052-003-01278-2.

CONFERENCES SPONSORED BY THE AACE

The Association for the Advancement of Computing in Education (AACE), an "international, educational organization whose purpose is to advance the knowledge, theory, and quality of teaching and learning at all levels with computer technologies," is sponsoring a series of conferences in 1993.

STATE 93, to be held March 17–20, 1993 in San Diego, California, is the fourth annual conference on technology and teacher education. The theme this year is "Technology Across the Curriculum," and will include papers, panels, workshops, and poster sessions on topics related to the use of technology in teacher education and instruction about technology in pre-service, inservice, and graduate teacher education. ED-MEDIA 93, will be held in Orlando, Florida on June 23–26, and is the World Conference on Educational Multimedia and Hypermedia. AI-ED 93 is the World Conference on Artificial Intelligence in Education, to be held August 23–27, 1993 in Edinburgh, Scotland.

For more information, contact AACE at P.O. Box 2966, Charlottesville, Virginia 22902; (804) 973-3987.

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Educational Change Through Technology ...

continued from page 1

The unique part of BESTNET is that it doesn't just link people who are physically remote, not even just those from different colleges and universities; what puts it at the forefront is that it is multi-national and cross-cultural.

Major Benefits

The BESTNET team has already used computer conferencing in several disciplines, including writing composition, anthropology, sociology, and psychology. Those involved with BESTNET cite several major benefits of computer conferencing over the traditional classroom-centered course. First, it tends to promote greater student participation. It also promotes student-to-student interaction, and improves students' writing, editorial, and logical skills. All of these things make students more active participants in the learning process, thus making the process more effective.

Second, students have greater flexibility in their schedules compared to having to be in a classroom at a certain time. As students become more diverse and less traditional in their approaches to education, this kind of flexibility is essential.

Third, for those students for whom English is a second language, or who may be having difficulties for other reasons, this format allows them to review materials as many times as they wish, at their own pace. This puts students in control of their own learning experiences.

The researchers have also found that students who may be at a disadvantage in a traditional classroom—minorities, the disabled, and those for whom English is a second language—participate with greater confidence in electronic communications than they do in non-electronic.

Finally, by allowing courses to be shared across institutions and even national borders, the medium also supports multi-national and cross-cultural learning and interaction. With a rapidly growing global economy and living in an increasingly diverse country, this kind of interaction has immediate practical implications and benefits.

Project Specifics

The BESTNET project is centered at San Diego State University, chaired by Dr. Frank Medeiros, associate vice president for academic affairs. It is organized as a consortium operating under the framework of the San Diego State University Foundation; representatives of member institutions comprise a Board of Directors. The other eight member institutions are California State University at Los Angeles; Centro de Enseñanza Tecnica y Superior in Tijuana, Mexico; Instituto Tecnológico de Mexicali in Mexicali, Mexico; Sonoma State University; the University of New Mexico; University of California at Irvine; Texas A&I University; and California State University, Dominguez Hills.

> ***By allowing courses to be shared across institutions and even national borders, the medium also supports multi-national and cross-cultural learning and interaction.***

Many of these institutions are the recipients of network equipment grants from Digital. In fact, these grants are especially significant to the Mexican institutions, who, before receiving the grant, used dial-up lines to access BESTNET and had to limit participation to faculty because of the cost. The Digital grant allowed for a direct line across the border.

Members of the BESTNET project now offer students a broad range of courses over the network, including Chicano Studies and Introduction to Computers, Technology and Society. Some members, such as John Witherspoon, chair of the telecommunications and film department at San Diego State, are developing courses that use BESTNET as the primary vehicle of course delivery. Professor Witherspoon's "Technological Trends in Telecommunications" course is conducted almost entirely without class meetings, by using BESTNET, videocassette, reading, telephone, and one-on-one meetings.

At the moment, students, faculty, and researchers involved with the project are located in North America, South America, Africa, Europe, and Australia. In the near future, BESTNET itself may be extended to include institutions in Africa, Latin America, the United Kingdom, and the Pacific Basin. Dr. Bellman has been working for two years to extend BESTNET into Africa, initially focusing on creating virtual classrooms and laboratories for institutions in Kenya and Zimbabwe. Other potential international applications for BESTNET include long distance courses through the Open University in England and access to graduate-level nursing courses for Latin American countries offered by the California State University, Dominguez Hills.

For more information about BESTNET, contact Dr. Frank Medeiros at San Diego State University, (619) 594-6883. *Thanks to both Mary Hoffman at Digital and Dr. Medeiros for the information contained in this article.* ■

Old World Computer Peopl

You know the type. The administrative version is a COBOL pro, convinced that COBOL is still best because it is "self-documenting." Thinks 360 architecture was the last great leap forward in technology. Committed forever to writing mainframe programs for users, because obviously, the users can't do anything much good on their own. Recently acknowledged microcomputers, but only for "peripheral" systems. The academic version is fervently programming in FORTRAN while still hoping that 36-bit computers will make a comeback soon and that Digital will finally reverse its position on the DECsystem-10.

Unfortunately, even with all of the skill and experience this person typically has, he or she is moving further and further away from what is required of today's campus computer professionals in this New World of computing. Ironically, people who were once attracted to the newness of it all, who were willing to put themselves out on long technological limbs, who were always among the first to try anything new as long as it taught them something they didn't already know, have now seemingly become the most risk-averse and conservative people in the computer center.

Both personal computers and the passage of time have created the New World; one in which users know a lot more than they used to about what they want and how to do it. And one in which the technology itself is moving rapidly forward into areas we never even imagined.

It isn't that Old Worlders don't have something to offer; in fact, what they have to offer is still extremely valuable. While it's true that some of them are not valued the way they used to be by the users, their skills and experience are needed as much today as they ever were. That's why it's so important for the Old Worlders to make the transition into the New World—it's not just for themselves, it's for the institutions they still work for as well.

A recent *Computerworld* editorial (June 15, 1992) emphasized this point: *"That's right, you're the old fogy who stands in the way of progress at your site. You're the person who tried to say 'slow down' to the millions upon millions of PCs that found their way into corporations in the 1980s and that now have to be replaced because they can't communicate with one another. You're the immovable stump who insists on promulgating internal network standards so users can, in fact, access data in minis and mainframes. You're the Luddite who insists on a calculated approach to acquiring new technology. You're the killjoy who pollutes those great downsizing plans with dumb questions like, 'Who's going to manage the LAN? Do you know how much it will cost? What will be done about data security?' You. You're 'old IS.'"*

> *Unfortunately, even with all of the skill and experience these people typically have, they are moving further and further away from what is required of today's campus computer professionals.*

The trouble is, even with all of the things Old Worlders did right, the New World is becoming increasingly uncomfortable with them, and for good reason.

The real problem is that much of the Old World behavior has very serious consequences, such as reinforcing the perception in the minds of users that information technology professionals are always throwing up barriers, finding reasons why something can't be done, and generally, being part of the problem instead of part of the solution. In addition, by not keeping up with the latest technologies, Old Worlders risk doing things less well and less efficiently than their institutions need them to.

The New World of computing demands that computer professionals be not only technically talented and up-to-date, but that they also be responsive, cooperative, user-oriented, and able to see beyond just their own concerns.

The Two Are Worlds Apart

The differences between Old World and New World computing are huge. Some examples:

Old World: Software is hard to write, therefore it should be hard to use. If users really want computers, they have to be willing to make the commitment to learning how to use them properly. **New World**: The easier software is to use, the greater the user's productivity, and that's the whole point. Yes, a commitment by the users is necessary, but not to the point where they are pulling their hair out in frustration.

Old World: Time spent in non-programming activities like documentation, meetings, and listening to the users is time wasted. **New World**: Interpersonal, communications, and writing skills are just as important as technical skills, and used together, will result in better software.

and New World Computing

Old World: The more elegant and sophisticated a program is, the better. **New World**: The more understandable and maintainable a program is, the better.

Old World: Users tell me something about what they want, then I go away for as long as it takes me to write the program, and deliver to the user a finished product. **New World**: Programs need to be first developed, and then supported, through partnerships formed with the user. Developing a program is an iterative process, incorporating user feedback throughout the development and maintenance cycles.

Old World: It doesn't matter how long it takes to do something, as long as it's done right. Deadlines can always be moved. **New World**: Establishing a deadline is making a commitment that must not be broken. A deadline is an expectation on the part of the user that something will result at a certain time—a time important to that user. This must not be violated.

Old World: Users have to be led, and sometimes forced, to use computers the right way. Users really don't know what they want most of the time. **New World**: Users know much more than software developers about their business and what needs to be done (and what doesn't need to be done). If a user has to be forced to do something, it is either because the user has not been sufficiently educated in the need to do it, or it is something that has little value to the user, and therefore, probably should not be done in the first place.

Old World: Programming is an art, not a science, and art is an end unto itself. **New World**: Programming is an art, not a science, and art that serves a purpose is art that is truly valued.

Getting From Here To There — Helping Old Worlders move to the New World is a joint responsibility. To be sure, Old Worlders have to recognize the need to move, and make a commitment to it, but their management also has a commitment to make as well.

First, of course, the Old Worlder's manager has to be New World, or this just isn't going to work. The manager has to set the example, offer leadership and guidance, and continually reinforce the Old Worlder's efforts to make the transition into the New World.

> *It's extremely important for the Old Worlders to make the transition into the New World, as difficult as it may be. It's not just for themselves, but for the institutions they still work for as well.*

Second, New World standards have to be established and communicated; hiring New World people whenever an opening occurs, for instance, sends a pretty clear signal. Similarly, the reward structure has to be such that New World behavior is reinforced and Old World behavior is discouraged.

Third, there has to be lots of training. Training should be part of every campus computer center's budget anyway, but in this case in particular, it is a crucial element. Whether it is in concepts or techniques, whether on-site or off-site, whether by videotape or in person, training just cannot be given short shrift.

Fourth, teaming Old World people with New World people can help the concepts and behavior rub off, as well as reinforcing the idea that teamwork is valued.

Advice for Old Worlders — Work *with* the users, not for the users, and certainly not against them. Learn what it means to be a member of a partnership or a team, working for a common goal.

There is as much technical challenge and opportunity for creativity (maybe more) in an end-user-friendly computing environment than in an old, cumbersome, hard-to-use one. CASE tools, relational databases, client/server technology, and networking are just as interesting as COBOL and VSAM.

It's okay not to be an expert in something; you will be given as much of a chance to learn all this new stuff as you need. And if you're not, learn it on your own, the way you did with a lot of the old stuff.

You will be pleasantly surprised at how much of what you know transfers over to the New World. It's not so different that you won't find a lot of it familiar.

Start thinking of your role differently. You no longer have to build every engine from scratch. Now you need to determine the placement of the steering wheel and decide whether the shift should be on the floor. Anyone can build an engine; it takes talent and skill to create a vehicle environment tailored to the driver's needs.

You are just as needed in the New World as you were in the Old, just in a different way. ■

Book Reviews

IT's Role in a Larger Mission

Sustaining Excellence in the 21st Century: A Vision and Strategies for College and University Administration
Richard N. Katz and Richard P. West
- CAUSE Professional Paper #8 -

Reengineering: A Process for Transforming Higher Education
James I. Penrod and Michael G. Dolence
- CAUSE Professional Paper #9 -

We all know what higher education has been facing in recent years, the major forces acting upon our colleges and universities. We know about declining enrollments, about the diminishment of the public's perception of the value of a college education, about the internal divisiveness racking many of our institutions. We also know we have to respond, that the status quo just won't work anymore. We need to become much more efficient through raising productivity and lowering costs, we need to become more effective by improving the delivery of instruction and the conduct of research, and we need to convince the public once again of the true value of a college education. We aren't talking about making small refinements here and there—we're talking about making fundamental survival-issue changes, and we're talking about not having much time to make them. It's not too early, nor is it an overreaction, to be somewhat of an alarmist about this.

What many people in higher education have not realized yet, or perhaps are just beginning to realize, is the critically important role that information technology will play in making these changes. The two new professional papers from CAUSE give us some real insight into this issue.

Sustaining Excellence in the 21st Century: A Vision and Strategies for College and University Administration is based on the premise "that the outstanding administration of a college or university's business affairs can enhance the institution's pursuit of academic excellence." What a great idea!! And how wonderful to think that many of our nation's great colleges and universities might actually be warming up to the idea that administration has to be every bit as good as the academic side for the institution to thrive—and perhaps even to survive.

Of course, some institutions have known this all along, but too many others have acted as if it isn't so. No more. No more the arrogance that comes from not having serious competition for one's students or faculty and that allows the administration—and administrative systems—to be slapdash and shoddy. The fact is that entering students, even in the very best schools, will no longer tolerate a lost admissions application or a botching of the financial aid package. No longer will colleges be able to withstand the consequences of budgets being overspent because budget managers have access only to month-old information on paper reports. No longer will alumni put up with a missing acknowledgement of their gift or excuse receiving three copies of the same issue of the alumni bulletin.

Administration has to improve. *Sustaining Excellence* (produced originally as a vision statement by senior administrative officials of the University of California), while working with the assumption that "U.S. college and university leaders have done an outstanding job in creating and nurturing the world's finest system of higher education," also acknowledges that pressures on higher education must lead it to change.

And the changes are major: more decentralization, a more nurturing and stimulating environment for future leaders, a smaller workforce optimizing the institution's resources, a networked rather than a hierarchical organization, and investment in technology to make it all happen. In fact, none of this can happen without institutional commitment to appropriate technological initiatives and a full recognition of the ways in which technology can contribute to the institution's goals, especially in areas such as distributed systems and networking.

If change is the goal, then *Reengineering: A Process for Transforming Higher Education* gives us a way to get there. The basic theme here is that it isn't enough to just employ technology to make current processes more efficient; the processes themselves have to be fundamentally altered—transformed—in order to take the most advantage of the benefits offered by technology. Again, our colleges and universities simply cannot ignore this imperative.

What needs to be done? First, our colleges have to develop a service orientation towards their students; in other words, students need to be seen as customers or consumers. Second, quality in many areas has to improve. And third, individuals have to be empowered to use their own judgement in carrying out their duties and responsibilities. In short, a new organizational culture, with information technology at its core, needs to be envisioned, developed, and sustained.

Is any of this going to be easy? No, but nothing worthwhile ever is. As Penrod and Dolence put it, "putting institutional mission before divisional or disciplinary priorities, eliminating unnecessary programs and redistributing scarce resources, reexamining and redefining long held assumptions, finding new ways to measure what we do, changing the parameters for the way leaders are selected, and redefining the internal reward structure of the institution may prove to be very difficult...." The word "may" is rather too gentle here, but do we have a choice? Can our colleges and universities not make these sorts of changes and still survive? That possibility is becoming less likely each day.

It is very significant that we are seeing these papers emerge from an organization like CAUSE, rather than, say, the American Association of Higher Education, or one of the other more general-purpose groups. In the preface of *Reengineering*, in fact, Penrod and Dolence state that the paper was written for professionals in higher education IT management. On one hand, this emergence from an IT organization is good news because we can see the now obvious links between the future of higher education and the future of campus information technology. Even though the subject matter in both papers has to do with higher education in general, it is clear that higher education is now inextricably tied to technology.

The bad news is that unless non-computer people are exposed to this information more or less constantly, they just aren't going to "get it" (in the words of Dick Nolan). So for every campus computer person who receives copies of these papers, there need to be ten or twelve non-computer people who receive them (and read them!) as well. Happily, CAUSE reports having already received a number of high-quantity orders.

Change in higher education is upon us, and information technology professionals have to be a part of these changes. Now, more than ever before, campus IT people have a real opportunity to influence what is going to happen at their institutions, and to help lead, not just the computing aspects, but the entire enterprise, to excellence.

Copies of these papers are available from CAUSE for $8 each for CAUSE members, $16 otherwise. Contact the CAUSE office at 4840 Pearl East Circle, Suite 302E, Boulder, Colorado 80301; (303) 449-4430. ■

> **"Because it is considered good corporate policy to get the leaders of tomorrow from the academic world, the software community is becoming increasingly populated by sophisticates who can merely write specifications, talk about the 'big picture' and deliver impressive speeches. At best, the graduates of these courses of study patronize the efforts of the people who code, test and maintain software systems. At worst, these newly minted graduates actively malign the programmers' approach to software development and express the opinion that anyone who writes innovative and creative code should be fired."**

Francis K. Walnut
"Lofty Ideas Don't Build Systems"
Computerworld
June 15, 1992

In Future Issues

- *This year's hottest technology issues: what our readers think*
- *Response to the Dean's Dilemma: a user versus the computer center*
- *Strategic planning: a business plan for computer services*

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EDUTECH RESPONDS

Q. Last month you had an article, "The Disappearing Mainframe?" which contended that large mainframe computing is going to be around for a while—an opinion with which I agree wholeheartedly. But in the May issue of *CIO Magazine*, the following appeared: "The mainframe's days are numbered....The latest poop predicts that only 45 percent of core applications will reside on host machines by 1994, down from 77 percent today....One-third of companies surveyed [by Forrester Research Inc.] said they will never buy another mainframe." These are the kinds of articles I get handed when I request an upgrade to our mainframe.

A. *It stands to reason that with higher education's (and everyone else's) tight budgets these days, the people who make spending decisions are going to try to find ways to save money. Mainframe computing has always been associated with big dollars, so the emphasis now is on downsizing. The other problem is that too many computer people are still "mainframe bigots" and have not yet come to fully appreciate what other hardware can do; that tends to make the decision-makers skeptical of requests for mainframe upgrades. In fact, making definitive statements about the lifespan of mainframe computing (whether short or long) is bound to get the statement-makers into trouble (who has ever been right in predicting anything in the computer industry?). The real issue is to make the most efficient use of all of the resources you have. If you can make an honest business case for upgrading your mainframe—meaning you have objectively examined the alternatives and can demonstrate why they are not as good—and you have built up credibility with your administration, then that should do it.*

Q. I've been the computer center director at a college for about nine months, and I'm having a really tough time. I just can't understand all the politics that goes on around here—no one wants to make a decision, and everyone gets involved in everything, no matter what their expertise. Is it like this at every school?

A. *Pretty much. Understanding the culture of higher education, and of your institution in particular, will help. It's not like being in business, but that is its advantage, as well as a source of frustration.*

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EDUTECH REPORT

The Education Technology Newsletter for Faculty and Administrators

Strategic Planning: A Business Plan for Computing

Strategic planning for information technology is a tough task. It takes time, commitment, good written and oral communications skills, and motivation. It takes lots of legwork and lots of discussion with users and potential users, the campus administration, faculty governance bodies, and students. It's no wonder it gets put off, and often not done at all. The pressing problem is that with technology changing as rapidly as it is, with the users becoming more sophisticated in their computing needs and wishes, and with budgets tightening everywhere, strategic planning is more important now than ever before. So the challenge is to make the creation of an information technology strategic plan for the institution as non-burdensome as possible.

One thing that will help is understanding the similarities between an information technology strategic plan and a traditional business plan. A business plan is a considerably less obscure document, one already known to many who might not otherwise be familiar with strategic planning. Especially now, with entrepreneurism sweeping the country and many new start-up companies needing investment capital, several book and software publishers are marketing business-plan-creation books and programs, leading the reader and user through the fundamentals of planning. The advantage is that all of the major sections are already identified, and often, a lot of the boilerplate text is supplied.

Even though a traditional business plan is basically a vehicle for raising money from potential investors, it can be easily adapted to discussing and describing the long-term strategy of campus information technology. In fact, even the goal of raising money isn't entirely irrelevant to campus computing; one important objective of a strategic plan is to get the campus decision-makers to support (that is, to fund)

continued on page 4

"In industry, alas, it has long been taken for granted that universities provide little practical training for computer programmers. Programmers often regard their formal training, if they have had any, as little more than a bad joke. Statements such as, 'I learned more in four months on the job than in four years of college' are so common as to lead almost inescapably to the conclusion that something is seriously wrong with the way programmers are educated in our universities today."

Nathaniel S. Borenstein
"Colleges Need to Fix the Bugs in Computer-Science Courses"
The Chronicle of Higher Education
July 15, 1992

NEWSBRIEFS

THE INTERNET SOCIETY MEETS IN JAPAN

At its first formal meeting, the Internet Society Board of Trustees gathered in Kobe, Japan, and took several steps that will affect internetworking worldwide. The Internet Society is an international professional organization established for evolving and extending availability of the techniques and technologies that allow diverse information systems to openly communicate. It also includes the Internet, the network of networks that links millions of users worldwide. These technologies and the Internet are very rapidly evolving and are increasingly viewed as critically important infrastructure.

The organization formerly known as the Internet Activities Board was merged into the Internet Society as a body called the Internet Architecture Board (IAB). The IAB will evolve the technology of the Internet and develop the series of international standards which are used today for common open interconnection, management, and use of diverse equipment, networks, and applications such as electronic mail, file transfer, news distribution, and remote logon. The Board of Trustees also decided to establish a cooperative relationship with the Geneva-based United Nations agency, the International Telecommunication Union (ITU). In addition, the Internet Society will submit a contribution to the ITU's Plenipotentiary Conference that underscores internetworking as critical infrastructure and the use of the Internet to significantly enhance global telecommunications collaboration. For more information, contact the Internet Society Secretariat, Suite 100, 1895 Preston White Drive, Reston, VA 22091; (703) 620-8990.

AWARDS FOR TECHNOLOGY AND TEACHER EDUCATION

The Society for Technology and Teacher Education (STATE), a division of the Association for the Advancement of Computing in Education, recently announced the 1992 awards for outstanding work in the area of technology and teacher education. Recipients included Brian Reilly, Glynda Hull, and Cynthia Greenleaf, **University of California Berkeley**; Ray Braswell, **Auburn University - Montgomery**; Thomas Brush, Dennis Knapczyk, and Lori Hubbard, **Indiana University**; and Janice Woodrow, **University of British Columbia**. For more information contact AACE, P.O. Box 2966, Charlottesville, VA 22902; (804) 973-3987.

ACM SIGUCCS USER SERVICES CONFERENCE

"Learning From the Past, Stepping Into the Future" is the theme of this year's Association of Computing Machinery's Special Interest Group on University and College Computing Services User Services Conference, to be held November 8–11 at the Stouffer Tower City Plaza Hotel in Cleveland, Ohio. Presentation topics include management strategies; financial options; marketing services; security and ethics; consulting, training, and documentation; networking and telecommunications strategies; and strategies for small schools. For more information, contact Al Herbert, University of Akron; (216) 972-7174.

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Responses to The Dean's Dilemma

A few months ago, we published a case study depicting the dilemma often faced by campus decision-makers these days: whether to authorize a director of a department under the Dean's area of responsibility feeling ill-served by the computer center (in this case, the Housing department) to proceed with a purchase of a microcomputer-based stand-alone system just for that office or to accede to the wishes of the computer center director who wants the campus to have a fully integrated information system and who has planned to address the needs of the Housing Office reasonably soon.

We received many responses to this case from both computer people and users; many of the responses were quite heated. We picked out representative excerpts from several of them:

"Fine. Great. Let the Housing Office do whatever it wants to. Just don't expect any help from us when it comes time to: 1) modify the software; 2) fix the software to make it work right; 3) connect the hardware to the campus network; 4) download student information from the mainframe; 5) any of hundreds of other things the Housing Office calls on us for."

"Of course the Housing Office should be allowed to get this new package. In any other environment, when a service or product is not working for you, you have the option of changing to a different service or product that works better. If the Housing department feels that the computing department has not been doing a good job for them, they should have the option—and even be encouraged—to get assistance elsewhere. Why should the computer services department have a monopoly?"

"Where is the information technology steering committee? Policies on this sort of thing should have been set up by this committee long ago."

"Let's look at the real issue: the Housing Office isn't getting what it needs from computing. It is reasonable to expect a certain amount of deferral of their needs on behalf of the whole institution, but not forever; not if they are expected to do their jobs properly. We all need tools to do our jobs; increasingly, a standard tool set for administrators and staff contains a computer. How long should they be expected to wait while everyone else on campus gets service?"

> *In any other environment, when a service or product is not working for you, you have the option of changing to a different service or product that works better.*

"What about the obvious mainframe bias on the part of the computer center? Even when the computer people get around to addressing the needs of the Housing Office, they are likely to come up with an overly expensive, overly cumbersome, hard-to-use system anyway. The housing people have found a good, solid micro-based system; more power to them!"

"Users should not go off on their own. Information technology needs to provide an integrated, campus-wide solution that serves everyone. This has been proven time and time again to be the most cost-effective way to use technology resources. But the real question in this case is why the users feel they have to go off on their own to get what they need. Are they just prima donnas who won't play by the rules, or has the computer center really been failing them? In many cases I've seen, it's a little of both, and both issues need to be dealt with. Neither issue is properly addressed by buying a stand-alone system that serves the needs of just one office."

"The question is whether the institution is looking at the short term or the long term. Buying this package for the Housing Office undoubtedly fills some short-term needs, but very likely at the expense of the long-term future of information resource sharing at this institution."

"It sounds as if the Housing Office has done its homework by choosing a system that has all the functionality they want. The problem is, however, that functionality, while very important, is not the only criteria by which to choose a system. In addition to vendor support services—which the housing director sort of glosses over in her memo—there are many other important things, such as compatibility with what the rest of the institution is doing. No administrative office operates in isolation anymore. The new system has to fit into the institution's information architecture."

"It sounds as if the computer director got her nose out of joint because she wasn't in on the selection process. Well, guess what? Users can make good decisions too!" ■

Strategic Planning: A Business Plan for Computing ...

continued from page 1

the strategy outlined in the plan. In that sense, the plan is for the purpose of getting the computing department's most important investors—the rest of the campus community—to buy into what the department wants to do.

On the right is a chart showing how a business plan format can be adapted and used for a strategic plan for IT. In addition, there are a number of guidelines for the process itself which should also be kept in mind; these are guidelines that business people try to follow when doing a business plan:

Get the ideas for the plan from outside the department. In other words, talk to the customers (users) and especially, to potential users about what they want the computing department to be doing over the long-term. The strategic direction for information technology should be set by the community, not by IT insiders.

Involve the whole department in creating the plan. Once the information has been gathered from the campus community, as many people as possible within the department should get involved in actually formulating the plan. Deciding on the appropriate technology to focus on for the long-term, generating ideas for technology research, doing budget projections, making sure policies and procedures are in place for the staff to stay current and motivated, and so on, should all be done by department people. Don't designate a "planning administrator;" make it part of everyone's responsibility, especially the managers. Do, however, designate a "planning coordinator" so it actually gets done.

Keep the document as short as possible. One of the failings of the academic environment is writing too much, and one of the pressures on anyone writing anything in this environment is to maintain the quest for length. Nevertheless, we all know in our hearts that the shorter the plan is, the more likely people will read it, even though no one on a college campus will actually admit that. Pretend that the readers of the plan are venture capitalists, who typically do not spend more than an amount of time counted in minutes reading a business plan. Be brave, don't count the number of pages or words, and make the plan as brief as possible.

> *Even though a traditional business plan is basically a vehicle for raising money from potential investors, it can be easily adapted to discussing and describing the long-term strategy of campus IT.*

Make the document readable. Even if it's short, it needs to be understandable and unambiguous in its wording. Do not, under any circumstances, use technical jargon or fall into the trap of using inflated language when concrete terms will do. Again, the goal here is to get this document widely read, understood, accepted, and supported.

Don't get distracted. In business terms, it's called overdiversifying, and it's generally dangerous. It is important to stay focused on the core needs of the institution and the talents and skills of the computer staff.

Keep the plan as fluid as possible, to accommodate both changing user needs and advancing technology. Make it clear that this is a living document, not something to be engraved in stone, and although the overall goals will remain the same, the objectives in meeting those goals are likely to change over time.

Be realistic in the cost projections. It used to be that in order to get something funded, the cost projections needed to be understated. This is one of the things that has contributed to computer people's lack of credibility, and should be avoided.

Why Bother?

Michel Robert of Decision Process International, a company in Westport, Connecticut, observed recently that perhaps strategic planning isn't such a critical thing after all. As reported in the August 1992 issue of *Inc. Magazine*, Robert believes in the Christopher Columbus School of Management: "When Columbus left, he didn't know where he was going. When he got there, he didn't know where he was. When he got back, he didn't know where he had been. But he got there and back four times in 10 years without getting lost." Perhaps so, but it is a far more treacherous world out there today, and those in campus information technology who do not commit to strategic planning do so at their own peril. Besides, Columbus never did find India. ■

The business plan outline came from "A Business Plan is More Than a Financing Device" by Jeffry A. Timmons, in Growing Concerns, a publication of the Harvard Business Review.

Plan Components		Purpose
Typical Business Plan	IT Strategic Plan	
Introduction	Introduction	The usual.
Management Summary	Management Summary	Many people will read just this section, so include all of the highlights, especially from the impact section (see below).
The Company and its Industry	The Department's Mission Statement and Current Service Levels	Every computing department needs a mission statement, and if it isn't there already, this is a good excuse to spend some time developing one. Describe the foundation purpose for information technology at this institution. Also use this section to briefly describe current service and activity levels, especially if there are service level agreements with the users.
Market Research and Evaluation	User Research	Describe the user community and the sources of input on what services need to be provided. Also describe potential users of information technology.
Proposed Products or Services	Proposed Services	This is the heart of the plan, a full description of the services that information technology will be involved with during the timeframe covered in this plan, as well as the goals to be reached by providing those services.
Community Impact	Institutional Impact	Give a clear description of the benefits to the institution if this plan is accepted. Highlight this section.
Marketing Plan	Marketing Plan	One of the too-frequently ignored areas of information technology, marketing should be emphasized in this section. Use this section to describe how new faculty members can find out what is offered for them in the computer center; the purpose of the newsletter; new campus outreach activities; and so on.
Design and Development Plans	Evolving Technologies	Give a brief, non-technical description of what the evolving technologies are and how they are addressed in a cost-effective way by this plan.
Manufacturing and Operations Plans	Operational Plans	Describe the process of achieving the goals set forth in this plan in operational terms, including short-term objectives.
Financial Plan	Financial Plan	What will this all cost, and how will it be paid for?
Overall Schedule	Overall Schedule	Outline the phases of the plan, and what will be accomplished when.
Important Risks, Assumptions, and Problems	Important Risks, Assumptions, and Problems	Describe the assumptions used to formulate the plan, and give a brief discussion of what might come along to alter what is in this plan, either positively or negatively.
Management Team	Omit	The management and staff of the department is already known to the community, so this section is not needed.

Administrative Systems: How the Faculty Benefit

Selling a new administrative system, or a major upgrade to an existing system, to campus decision-makers can be difficult, particularly when budgets are tight. New and enhanced systems are usually sold by citing the benefits to be accrued in the efficiency of campus administrative operations and the better data and information that will result. But one area that often is not emphasized enough is the set of benefits to the faculty of the new system. Focusing on this area and bringing the faculty on board with the need for a new or significantly improved system can make the difference between getting budget approval for the system and not.

Although it may be often hidden or brushed aside by administrators as not really significant, faculty actually spend quite a bit of time in so-called administrative tasks, such as checking their class lists, filling out grade sheets, developing course descriptions, and advising students on their courses of study. Consider these comments from Dr. John Biddle, an associate professor in the School of Business at the University of Louisville:

"If what an institution of higher education is all about is the education of its clientele, the educator should be provided with the latest tools available, and the red tape associated with the teaching/research process should be reduced to a minimum. What red tape you ask? Consider the instructor who has 200 or more students a term. Obviously, the class list is in electronic form, but the instructor receives it in hard copy. By the time the class list arrives in the instructor's mailbox, it is out of date, even if it is produced daily.

"The problem is really compounded here. The instructor wants to maintain the class records in electronic form, maybe on the same system the Student Records System is on. In this instance, the instructor receives the class list in hard copy and has to rekey the information back into the same system it came from. Another scenario is that the instructor has a workstation with a connection to the mainframe and wants to keep the electronic grade book on the workstation. The time wasted in rekeying the grade book information in either case is valuable time that could have been spent preparing for the class or doing some other productive activity." (From an article in the Summer 1992 *SIGUCCS Newsletter*, "Instructional Data Requirements from Administrative Systems.")

> *Focusing on this area and bringing the faculty on board with the need for a new or significantly improved system can make the difference between getting budget approval for the system and not.*

It is easy to hear the frustration in this faculty member's voice. Faculty are not always included in the original needs analysis for the system, and as a result, their needs are not always addressed adequately. And even if the system itself does address them, there are often administrative policies that prevent faculty from using the system.

But a well-designed, modern campus information system typically has many advantages for a faculty member, such as these:

Dealing with the Registrar's Office and keeping records more efficiently. Whether class rosters are printed or on-line, they will be more accurate with the new system. They can be downloaded to a faculty member's workstation for note keeping, grading throughout the semester, and so on. On-line final grade sheets and grade entry and verification will be enhanced. Keeping track of students' statuses in terms of withdrawals, changes of major, and leaves of absence will be easier.

Support for advising. On-line academic information for a faculty member's advisees will be available on the faculty member's workstation, as will degree audit information. Answering questions such as, "What will I have to take next year if I switch from chemistry to fine arts?" will be much easier, along with supplying information for preparation for graduate school, degree changes, graduation postponements, and so on.

Budgets, preparing and monitoring. The odious task of preparing a budget will be greatly alleviated by the new system's budget preparation capabilities. In addition, being able to see up-to-the-minute on-line budget information, rather than waiting for monthly reports that seem to never arrive, is a need shared by administrative department heads as well. Even if the faculty were not consulted on their needs, this feature is likely to be part of the new system anyway.

Purchase orders. Both filling out purchase orders and then checking on their status will be part of a new system, a feature especially important for faculty engaged in grant-supported research.

Course descriptions. Using text processing software to write course descriptions for the catalog and then transmitting them electronically to the person responsible for collecting them will make life easier for faculty, especially if they can modify existing course descriptions.

Class scheduling will be easier for the Registrar's Office, and therefore, more likely to result in a better schedule. For faculty who need to balance their teaching loads with other duties such as research, advising, committee work, and office hours, a more easily created and modified class schedule will be a major advantage.

Personnel data. Faculty should be able to look at their own personnel records, and perform other tasks such as changing their home address or signing up for benefits. Department heads should also be able to access certain parts of the records of the faculty members in their department.

Electronic mail with administrators. General communication across campus should be enhanced with a new administrative system. Usually, if electronic mail is available before a new system, it is confined to just the academic side. Acquiring a new administrative system often leads to an examination of the need for a campus-wide electronic mail system that connects everyone.

Generally improved access to better information. Typically, new administrative systems hold a great deal more information than the old ones, and much of that new information will be on-line. Overall, both the quantity and quality of information will be greatly improved, as will the access methods.

Campus-Wide Systems

Including the faculty in the needs analysis is extremely important. The term "administrative system" is fast becoming outdated; the systems that need to be put into place now are campus-wide, and should address the needs of everyone. ■

> **"In an era when budgets are getting tighter and competition among colleges and universities for a declining student population is increasingly fierce, it behooves college administrators and information systems personnel to provide better ways to improve the flow of information to facilitate faster, more efficient decision making. In the 1990s, administrators need an easy way to harvest information for analysis and reporting needs—without investing a lot of money and programming time. Information harvesting is the cost-effective transformation of raw data from host computers and servers into meaningful information on the desktop."**

"Information Harvesting: Leveraging Desktop Solutions"
Query
Spring 1992

In Future Issues

- *This year's hottest technology issues: what our readers think*
- *What the SCT buyout of IA means for higher education software*
- *Ethical issues in computing center management*

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EDUTECH RESPONDS

Q. I just started here as director of computer services, and it looks like I have inherited a real mess. The users hate this department, the administration is fed up with all the budget increases over the past few years with little to show for them, and the faculty generally thinks we're a waste. Where do I begin?

A. *You need to begin with the basics. Make a determination as quickly as possible—as an outside consultant would—as to the real causes of these problems. Then make two plans: a short-term fix plan and a long-term strategic plan, the latter one evolving as you apply the short-term fixes and get to know the institution and the users. You'll have a certain amount of leeway during your "honeymoon" period, so use it to your advantage. Clean up internal processes and the computer center environment. Don't promise anything to users unless or until you know for sure you can deliver, then make it something small. Boost staff morale by saying what you mean and sticking to it. Build slowly, but steadily; don't hesitate to say no when a user's request is unrealistic, but offer a workable compromise. Work toward creating partnerships and building credibility. Your users, your bosses, and your staff all need to know they can rely on you.*

Q. We recently completed building a new technology center on campus, and have filled it with hundreds of workstations and workstation furniture. The problem is that we are now having discussions (arguments, really) about whether some of the workstations should be enclosed or whether they should all be left out in the open. As the director of computing, I think this should be up to me, especially since I was the one who determined the numbers and configurations of the computers.

A. *It should be up to the teaching faculty to make this decision. It should also have been up to them to decide on the workstation configurations and numbers. These are decisions that will have a direct effect on their ability to teach, and the student's ability to learn. You should have a committee of selected faculty members meet on a regular basis to discuss these issues and to make the final determinations on them, or at least, the final recommendations to the administration.*

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THE EDUTECH REPORT

September 1992

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The Education Technology Newsletter for Faculty and Administrators

Hot Issues
1992–1993

In our annual telephone survey to determine this year's most important issues for higher education information technology, it didn't take long to see that what is happening in IT is very much a reflection of what's going on in higher education in general: shrinking institutional income as enrollments decline, interest rates continue to fall on investment income, and the recession continues to affect fund-raising efforts; increased pressure for spending on financial aid, building maintenance, and faculty salaries; and in many places, a highly-charged political atmosphere making dealing with campus politics even hairier than usual. This all serves as a most challenging backdrop to the issues and concerns of college and university information technology professionals. In speaking with over one hundred higher education directors of computing, we have come to the conclusion that the word of the year is pressure, enormous, and in some cases, overwhelming.

Level or shrinking budgets. Retrenching, downsizing, consolidation, and contraction were the words we heard over and over. And all resources are being affected: people, machines, software, and dollars. As one respondent put it, "We have lost our networking focus, we are postponing projects; we are reallocating people's time." We heard about travel and training cuts, cuts in discretionary monies so that there could be no more favors, cuts in mandatory maintenance and supplies, and cuts everywhere else. This issue, talked about by every one of our respondents, was not only an issue in and of itself, but also permeated every other issue that our respondents discussed. Simply put, but most difficult to actualize, the computer services department has to do more with less.

Growing inadequacy of existing systems. Despite huge efforts to maintain them, many existing systems (both hardware and software)

continued on page 3

"Our campuses are getting networked—the ground swell of user interest is seeing to that. It is our job as directors to channel those energies, provide the coordination and framework to make them cost-effective, and work with our faculty and administration to accomplish the goal."

Ardoth Hassler
Executive Director, Computer
Center
Catholic University of America
Letter to the Editor
EDUCOM Review
July/August 1992

NEWSBRIEFS

EDUCOM ANNOUNCES 1992 ROBINSON AWARD

EDUCOM has announced that the third annual Louis Robinson Award has been given to Stanley G. Smith, Professor of Chemistry at the School of Chemical Sciences, University of Illinois at Urbana-Champaign. In making the announcement, EDUCOM President Kenneth King said, "Stan Smith's work represents the very best in the application of computers to teaching and learning in higher education. He has been a continuous force for innovation as well as a dedicated teacher; I am delighted to join in applauding his achievements."

The award consists of $25,000 in cash and $25,000 in IBM equipment and software; it honors the late IBM advocate of computer technology applications to education, Dr. Louis Robinson. Funded by IBM, with the recipient selected by the EDUCOM Board of Trustees, the program was created to stimulate and recognize advances in using information technology to improve teaching and learning. The award will be presented at the EDUCOM conference in October.

IBM LENDS EMPLOYEES TO HIGHER EDUCATION

In a partnership between business and education, IBM is lending 34 employees to schools and other educational organizations during the 1992–93 school year. Now in its twenty-first year, the goal of the program is to help minority and disadvantaged students pursue higher education, especially in the critical fields of science and engineering, which face a nationwide shortfall of students.

Under IBM's Faculty Loan Program, employees receive full pay and benefits while they work in colleges, universities, high schools, and related organizations. Most faculty loan participants teach at colleges and universities where the majority of students are women, African-American, Hispanic, American Indian, or are students with disabilities. Other employees are on loan to minority engineering programs at universities, where they seek to encourage minority and disadvantaged students to take science and math courses in high school to prepare for a technical major in college.

COMPUTING AND THE CURRICULUM

"Computing and the Curriculum—New Tools For Scholarship" is the theme of this year's series of computer workshops sponsored by the California Educational Computing Consortium (CECC). The Fall '92 workshops, consisting of three concurrent sessions on computing as a tool for learning, are scheduled for October 23–24, and are being hosted by the University of San Diego.

For more information, contact Jack Pope, University of San Diego, (619) 260-4810. To register, contact Alexia Devlin at San Francisco State University, (415) 338-2582.

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Hot Issues: 1992–1993 ...

continued from page 1

are being left behind by the changing needs of users. As the systems age, they seem to meet fewer needs than ever, and needs are changing quickly, as is the skill with which users now approach computing. "Our systems are old and clunky, and, by the minute, it becomes harder and harder to make changes," said one of our respondents, "but we just can't afford to toss them out at this point." The pressure is to somehow make these systems adapt to current needs for as long as possible, until they can be replaced.

Outsourcing. More people this year mentioned outsourcing than has ever been the case in past surveys. It is clearly more of a budget issue than a service issue, at least for computer center directors, and when it was mentioned, it was cautiously. The word most often used was "maybe." No one that we spoke with suggested full facilities management, but many are considering at least partial outsourcing for specific tasks, such as data entry. The pressure is to look at outsourcing before others outside of computing do, to be fully prepared with objective reasons for and against, and not have to be defensive.

Decline of "Us Versus Them". Many respondents spoke to us of increasingly better user relationships; in some cases even using the word "partnerships." On both the academic and administrative sides, relations seem friendlier with the computer center than ever before. One respondent said, "There is so much computing going on now all around campus, with all the classroom use we are seeing, and all of the administrative microcomputing, that the users really need us to be responsive and cooperative. If we weren't, this institution just would not put up with it; there are too many users now for any nonsense." This trend may also be indicative of a narrowing gap between front-line computer services people and their users, as users become more technically proficient and computer people learn more about the work being done in user departments.

Enterprise-wide computing. For most, it's more a dream than a reality at this point, although many mentioned using it as a basis for strategic planning. But as one respondent told us, "Enterprise-wide computing is motherhood and apple pie; you just can't argue with the sense of it. Unfortunately, we haven't got the time, the expertise, or the money to make it happen." The interoperability (or lack thereof) of current systems is the major roadblock at this point.

Re-. From recoding to reengineering to reorganizing, there is a lot of redoing going on. At this point, it is happening more in the computer center than in the institution as a whole (especially reengineering) but we may be beginning to see some progress here.

Viruses. This is new on our list this year, and was mentioned by a significant number of directors with whom we talked. It seems as if every time a group of people on campus, such as an academic department, begin using microcomputers in large numbers, the first thing that happens is that they are attacked by a virus. Good computing habits and dealing only with clean disks are learned behaviors, and computer centers haven't had the chance to get the word out to everyone yet.

Networking. We saved this one for last, not because it wasn't mentioned often; just the opposite. This is the seventh year we have done a Hot Issues feature, and networking has been in every single one; it now deserves this special place of honor. It isn't that some colleges aren't coming up with solutions, it's just that even for the ones who are, the solutions seem so, well, temporary. One of our respondents said, "What's happening now in networking makes what happened to microcomputers in the mid-80s seem like a turtle on Valium." Should we have our own BITNET node? Will wireless transmissions make us regret all the money spent on trenching? Are some of those schools that had the campus cabled by a commercial cable-TV company regretting the fact that students watch too much MTV? How many of our faculty really *need* the Internet? Can we have both IBM PCs and Macs hook up to our new administrative system?

And still, some campuses haven't even begun on their networking quest, or are using five- or seven-year-old telephone switches for the small amount of data transmission that's going on. The pressure is to pull it all together, and as one respondent put it, "make it all work like the books say it should. But it doesn't." Most of the people with whom we talked still consider themselves in the stage of building the infrastructure, taking small, tentative, uncertain steps here and there. Major proposals are met with much doubt and skepticism (and of course, a reluctant to commit the resources). There are lots of schools doing pieces of it, but very few doing it all.

Other topics mentioned. Providing access to computing for those with disabilities, electronic transmission of administrative data from off-campus (such as transcripts and admissions applications), staff (and director) burnout, and planning versus fire-fighting. ■

Total Quality Mana

by Walter Weir

On Monday, April 13, 1992, at 9:15pm, a fire broke out in the hallway adjacent to the Computer Center at Fordham University. The fire was intense, taking 13 fire trucks and 70 New York City firefighters several hours to extinguish. While the fire was confined for the most part to the hallway, there was major damage to the principal wiring plant that allows all of our users on three campuses access to the mainframe computers.

The day after the fire, at about 12:00 noon, our staff was allowed into the Computer Center to start repairs. By 5:00pm that same evening, we were able to provide 40 percent of our users with total system access. Our staff then had to leave the computer center because of the cleanup activity that had to be done by Physical Plant, but by the close of business on the following day, Wednesday the 15th, we had over 90 percent of our users back on-line with all of our systems operating.

How did we do it? Total Quality Management. Fordham University and especially the Computer and Information Management Systems (CIMS) department have been actively involved with TQM since April 1991. Based on principles that were being taught in the classrooms of Fordham, a Task Force was initiated at the Graduate Business School. The purpose of the task force was to transform our administrative functions according to TQM.

CIMS quickly embraced this new philosophy and took some dramatic steps to make sure that TQM was really used, and not just talked about. For example, one of the underlying principles of TQM is the use of teamwork to get problems solved. CIMS started eight process improvement teams (PIPs) during the year before the fire. These teams had the task of dealing with issues such as the management of university-wide equipment inventories, customer satisfaction and communications between users and the Computer Center, disk space management, academic computing in the labs, improving relations between systems programmers and applications programmers, the registration process in the Graduate School of Business, operator procedures, and network organization.

> *Each person knew exactly what needed to be done and got on with doing it. They had the right tools and they had the authority; as a result, they were able to save us from what could have been a major catastrophe for this university.*

By the time the fire occurred, several of these teams had already been working on problems in a way that ended up assisting us greatly in the fire recovery process. For instance, the network team had been looking at the issue of customer satisfaction, and at the proper inventory methodology to be used, addressing the correct tagging and identification of various circuits and communications lines that come into the Computer Center.

Prior to the incorporation of TQM, several of our network people were typical back-room experts, those who always seem to get along better with equipment than with people. But with the TQM philosophy of individual empowerment, we were able to get these people together to talk so that all of our network people could be in tune with management and understand more clearly what their jobs were and what was expected of them. This team determined what the real problems were in terms of having the correct types of tools and test equipment available and the correct network maps that needed to be developed. The TQM methodology brought all of these issues to the fore so that they could be acted upon.

During that process, the "management team" performed in a support and resource role to ensure that the right tools and equipment were in place. When the fire occurred and we had to send our network people in to repair the damage, no one had to stand over them and say, "You do this and you do that." Each one knew exactly what needed to be done and got on with doing it. They had the right tools and they had the authority; as a result, they were able to save us from what could have been a major catastrophe for this university. In fact, they were able to resolve it in such a fast and expeditious fashion that many people were totally amazed.

Walter Weir is the executive director of Computer and Information Management Systems, and Sylvia Westerman is the director of the Graduate School of Business at Fordham University.

nent: A Trial by Fire

Sylvia Westerman

Some typical comments: Dr. John W. Healey, vice president for planning and budget said, "That we were able to be in service so quickly is a tribute to our TQM management." Stephen Bordas, university registrar, said, "After I heard about the fire, I panicked, thinking about the impending Graduate Business registration and the University graduation just weeks away. My potential doctor bills were quelled by the early resolution of these problems through the use of TQM." Richard Waldron, vice president for enrollment management, said, "Great job! It would have been a real mess if this was a prolonged outage."

Another factor contributing to our success in this crisis is that we have also tried to involve our vendors in our TQM experience. Digital Equipment Corporation (a TQM organization itself), which handles all of our mainframe maintenance, and General Electric Corporation, which handles all of our high-volume equipment and is also a TQM organization, have both participated in several of our process improvement team sessions.

The results of this close cooperation were readily apparent during this crisis. When our Digital sales representative, John Salzmann, arrived on the scene the morning after the fire, he already had a complete understanding of our organization and structure. He knew who was responsible for what because he had been involved in working out these issues with us. He arrived on the site with a disaster recovery plan that ready to go into place the moment it was needed. He was also able to roll up his sleeves and assist us in providing technical experts in our systems area as well as network technical experts. Because GE was also part of our TQM team, the GE repairman who arrived on the scene the next day was able to size up the situation quickly, and could begin to work immediately with our network people.

Because of the TQM philosophy that we had adopted, our network folks down to the lowest level were empowered to make decisions in their own areas. As a direct result, we were able to diagnose problems and effect repairs much faster than we would ever have been able to without TQM as an underlying and guiding philosophy.

> *By listening to the staff on a regular basis, and in a non-threatening way, management can begin to understand what the real frustrations are. With TQM, management's role is to provide the necessary resources, not the details.*

By listening to the staff on a regular basis, and in a non-threatening way, management can begin to understand what the real frustrations are. With TQM, management's role is to provide the necessary resources, but not necessarily the detail of what the staff is to do. By turning the management pyramid upside down, things work more smoothly. The work is done quicker, and in most cases, it's done better. Of course, it isn't that way 100 percent of the time, but in comparing the traditional top-down management style with TQM, it is obvious that TQM is an overall better method of operation in terms of productivity and efficiency.

Our customers are happier. They feel they can talk to people in the Computer Center and get results. The users don't have to call management every time to get something done. Now, by calling the first-level person, the users will get what they need in an expedited fashion. The CIMS staff also is happier because they are more confident and in control; they feel important because they are empowered to take action.

The fire at Fordham could have rendered us helpless for weeks. The center of the fire took place at the hub of all of our communications—traffic, dial-in circuits, intercampus T-1 links, and the cabling plant. Had we not incorporated TQM in our work, had we not lived and breathed the philosophy and made it work for us, I believe that we never could have accomplished what we did in such a short period of time. The staff did an outstanding job; they did an enormous amount of work, and they deserve the credit.

I think one can take our experience as a reason to consider TQM. I believe our decision to go with TQM was the right one, and our successful management of the emergency is the proof. The CIMS team and the vendors did the work; the job of management ended up being writing thank-you letters to them. It would be hard to find a better example of the benefits of TQM than that. While I can't say that TQM is perfect in all regards, I can say that TQM works for us. ■

BEST COPY AVAILABLE

An Open Standard for Courseware

by Eduardo Rivera and Evelyn Haddock

The belief that computers can provide benefits and the optimistic expectation that they are now supplying said benefits have fueled a tremendous growth in the use of computers in education over the past several years. But in the long run, educators will lose faith in the value of computer-based instruction if objective evaluations begin to accumulate evidence that computers have made little difference in the education of students.

Problems of the old style ——
Despite new applications for hardware and courseware in learning, expectations have not always been met. Although computers can provide lessons that are fast-paced, interactive, friendly, and multimedia-based, many students feel that courseware in general is slow, repetitive, very similar, and boring.

The same attitude has befallen many instructors. At the beginning, they are usually very enthusiastic about computing courseware approaches. But later, regardless of the results and of the time they invested to learn computerized tools, they may abandon these new approaches. This happens when they perceive computers as yet another rigid instructional technology. In this case, instructors feel that they are only administering agents for pre-programmed material. Naturally, creative and innovative instructors feel uncomfortable with such courseware. Further, although some courseware packages are visually exciting, they can still be discouraging when an instructor is relegated to a passive role. This lack of enthusiasm is easily transmitted to students, overtly or subconsciously. Finally, students also want to use computers more independently by exploring concepts as opposed to just selecting options.

Opening up closed systems ——
We believe that the primary reason for inadequate use of courseware in the classroom is due to the nature of "closed packages." A closed package is software that can only be executed. Such a package cannot be modified, nor merged with other packages or adapted in any way by an instructor. The only role left for the instructor is to show students how to "play" the courseware.

> *An ideal scenario would be that each instructor produces his or her own courseware in an institution with unlimited computer facilities.*

Authoring courseware by instructors would seem to be the answer, and it is, to the extent that it is practical. An ideal scenario would be that each instructor produces his or her own courseware in an institution with unlimited computer facilities. At the moment, this is not feasible. Creating courseware is much harder than writing a book. In addition to academic content, the author must cope with visual effects, human-machine interaction, ordering sequences, organization, and a host of other details. Learning these tricks takes experience, so in most cases, the quality of self-made courseware does not compete with commercial products.

It is estimated that for each hour of courseware use marketed by a software house, the development takes up to 200 hours. Despite the many excellent authoring tools available, it is presumable that most instructors (with some notable exceptions) will not develop their own courseware. We are convinced, however, that instructors can be trained to evaluate, modify, adapt, and use current courseware.

New concept ——
Teaching tools must be adapted to the different styles and approaches of every instructor. This is why, even though an instructor can teach the same subject every year, the course is unique. Computers are being used more and more in the classroom as an instructional tool. However, if they cannot be modified, then they contradict the flexible spirit of pedagogy.

With this in mind, we suggest a new concept for educational software—Open Courseware. In essence, Open Courseware is academic content-specific software that can be modified by instructors, linked to other packages adhering to the Open standard, and then redistributed to other instructors for them to modify or link, and so on and so on, to infinity. The "open" part of the term relates to software in the sense that it would be independent of commercial companies.

Eduardo Rivera and Evelyn Haddock are professors in the department of Math and Computer Science at the InterAmerican University in Puerto Rico. This article was adapted with permission from one originally published in the August 1992 T.H.E. Journal.

Under this scenario, an instructor would be able to modify and transfer part of the courseware to any other piece of courseware, without violating copyrights or paying extra fees. This implies that the interface for any commercial tools for such Open Courseware should be standardized, even though each tool would be different.

The ten main characteristics of Open Courseware are: **portability**: independent of machine architecture; **modularity**: can be cut and pasted with other modules; **adaptability**: modifiable by the instructor; **flexibility**: simple to incorporate tools or other programs; **nonprocedural**: should not impose a sequence of learning; **bidirectional**: student and computer can ask for information or provide explanation; **critique**: provide tools or guidelines for critical thinking; **interactive**: between students and instructors, or students and students; **instructor-oriented**: so the instructor can adapt it for use in the classroom; and **accessible**: for a large variety of educational systems internationally.

We believe our concept for Open Courseware would assure a larger demand than the traditional closed packages. Software houses need not fear the instructors who would be writing the modifications and adaptations to Open Courseware. Software houses should instead shift their focus to providing materials and tools for instructors to use in adapting courseware to classroom needs.

Conclusions

Closed packages of software are condemned to fail because they work against pluralism and the freedom of educators to use a tool. To develop Open Courseware there will have to be an agreed-upon standard approach to developing and modifying any piece of courseware. In addition, closed courseware produced massively emphasizes quantity. In order to improve quality, courseware must be able to meet individual educators' needs. Under our Open Courseware concept, instructors could use only those parts of a package that fit their interests and use them in the order they prefer.

We are faced with a great opportunity to improve the quality of education. In the following years, millions of dollars will be spent on courseware, but this investment should be based on a standard interface that allows the building of better courseware. If this issue is focused upon, priorities for courseware will be directed to adoption and adaptation by educators.

We are convinced that the future of courseware needs to proceed in this direction. ■

"Networks change the way people teach and learn; networks will cause curricula to be restructured; and they are providing new educational opportunities for certain kinds of students. In the long term, it seems almost certain that networks and the resources available to faculty and students through networks will have a broad impact on the university in terms of how classes are taught, who teaches, and the composition of the student body."

Christinger Tomer
University of Pittsburgh
"Integrating Network-Based Information Services
into Instructional Settings"
Academic and Library Computing
July/August 1992

In Future Issues

- *What makes software award winners different from other faculty?*
- *Coping with administrative software vendor demos*
- *Ethical issues in computing center management*

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EDUTECH RESPONDS

Q. Every year, our Personnel department makes all department managers on campus do performance reviews for their staffs. As the director of computer services, I find this one of the most terrible things I have to do, and dread it coming around each year. I know my staff isn't perfect, but the ones who are really good already know it, and the ones who are not as talented are already trying as hard as they can. The reviews are either totally superficial or horribly embarrassing. So what's the point?

A. *Performance reviews are difficult, but they can also reap large rewards for everyone if done properly and in the right spirit. You need to consider that everyone* *deserves* *to hear both positive and negative criticism, given as objectively as possible, and in the spirit of reinforcement, rather than punishment. One of the things that will help is to have a form, designed specifically for computer people (your Personnel office can probably help with this), that guides you in giving a fair and honest appraisal for each person, based on his or her job description and performance. Another thing that will help is to set goals for all of your staff members, to give both you and them a yardstick by which to measure progress. The benefits of performance reviews come mainly from the opportunity to offer important feedback, both positive and negative, which is a critical component of any system, human or otherwise.*

Q. My Academic Computing Advisory Committee just delivered a report to me recommending steps to be taken to improve academic computing. Unfortunately, since the committee could not reach a consensus, there are different approaches outlined in each step. As the Provost, I don't feel technically qualified to make decisions about which approach is correct. Should the committee be expected to come to a consensus on technical issues, or is that unrealistic?

A. *It may be unrealistic, depending on your environment, but the larger issue is the role of the academic computing director. In your description, there seems to be a step missing in which some scrutiny and analysis is applied to the committee's report. This is usually a function of the person in charge of computing, who serves as a conduit between makers of wish lists and administrators who want realistic solutions.*

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Providing Information Technology Services to Higher Education

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THE EDUTECH REPORT

The Education Technology Newsletter for Faculty and Administrators

Decision-Making for Academic Computing: the Cascade Effect

Maintenance costs on the campus VAX system, used primarily to support academic computing, had gotten too high the last couple of years, and the administration wanted to look into options for reducing the costs. A variety of belt-tightening measures were already underway throughout the college, and in that spirit, the academic vice president asked the director of academic computing to consider ways in which hardware maintenance costs could be reduced. These ways, suggested the vice president, could range anywhere from replacing the VAX to dropping its maintenance, or any other option that seemed reasonable and cost-effective.

The director had some ideas about how this might be done, but he also wanted to talk it over with the academic computing committee. At the committee meeting, however, instead of the endorsement of his ideas that the director expected, what he got instead was a lot of loud disagreement. As soon as the subject was opened, in fact, two very vocal committee members immediately jumped into the discussion—one who wanted to replace the old VAX with another less expensive VAX, and the other who wanted an IBM RS/6000. Once they had their say, two other members expressed their thoughts that networked microcomputers ought to take the place of a central machine, and yet another person wanted to talk about operating systems and the fact that the old VAX never had the right one on it.

Unable to come to an agreement, the director and the committee submitted a proposal to the administration with four options for addressing the VAX situation, and left it up to the administration to decide which one was best. Unable to sort out the technical complexities of the proposal options, the administration chose the one with the least upfront dollar outlay—and the decision has been suspect ever since.

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"The new learning and information technologies can change teaching and learning processes and improve the organization and management of schools. However, changes will not occur simply by bringing new technology into existing curriculum ... or merely by automating existing administrative procedures. Reconceptualizing curriculum and instruction, and, in turn, the organization and management of schooling need to be accomplished first—or at least simultaneously with the design and implementation of an information system."

John Phillipo
Director, Ctr. for Educational Leadership and Technology
"The Twenty-First Century School"
EDU Magazine
Spring/Summer 1992

NEWSBRIEFS

A NEW PRESIDENT FOR EDUCOM

EDUCOM has announced that Dr. Robert Heterick, Vice President Emeritus at Virginia Polytechnic Institute and State University, will be its new president effective January 1, succeeding Ken King, who is retiring. Heterick has commented on his appointment, "As we enter the Information Age, we will discover that knowledge will become the driving force of society and access to that knowledge will become a measure of wealth. EDUCOM is committed to the belief that education and information technology will be the levers of progress in the next decade. Situated as it is, on the boundary of the higher education and information technology communities, EDUCOM will play a pivotal role in this nation's entry into the Information Age. I am very pleased that I will be able to play a part in this exciting transformation."

During his thirty years at Virginia Polytech, Heterick has held a number of positions and is currently Professor of Management Science. He has chaired two departments, directed a research laboratory, and served as Assistant Dean, as Director of the University Computing Center, and as Vice President for Information Systems. Heterick is also a member of several commissions and boards including the Coalition for Networked Information Steering Committee, and has held positions with CAUSE, including Chair of the Board of Directors.

EDUCATIONAL SOFTWARE "TO GO"

Trying and buying educational software at the University of Southern California campus bookstore in Los Angeles can now be done by pointing a finger on a touch-sensitive screen. The *Courseware on Site* system, developed by Intellimation with the support of Apple Computer, features an interactive kiosk and invites shoppers to "test-drive," evaluate, and purchase their choice of over 200 educator-developed programs.

The kiosk offers information about programs that can be accessed by subject (from art to zoology), title, keywords, hardware and software requirements, or any combination of such cues. Users can explore the software that best serves their needs by investigating program summaries, viewing "snapshots" or slide shows of each program, or by launching fully operational versions of the software. For more information, contact Intellimation, Library for the Macintosh, P.O. Box 1922, Kiosk Department, Santa Barbara, California 93116.

SOFTWARE FOR ART HISTORY

The Getty Art History Information Program (AHIP) will be releasing shortly the *Art & Architecture Thesaurus: Authority Reference Tool Edition*, the first product using new creative reference software that AHIP has developed for the field of art history and related disciplines. Carefully researched and constructed, the thesaurus' vocabulary was developed to ensure accuracy and consistency of information retrieval, and to facilitate the exchange of electronic information. For more information, contact the J. Paul Getty Trust, 401 Wilshire Boulevard, Santa Monica, California 90401; (310) 395-0388.

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SCT and IA: Impact on Higher Ed Software

Just a short time ago, two giant rivals in the higher education software marketplace became one; Systems and Computer Technology (SCT) acquired Information Associates (IA) in a move which is already having a major impact on the higher education software marketplace. Among all of the obvious virtues of such a move for SCT (including increased software maintenance income and having to contend with fewer competitors) comes a set of concerns for both IA and SCT clients, as well as for potential administrative software customers; these concerns are being addressed in a variety of forums by SCT, including discussions over the Internet. What follows is a summary of the major issues, along with responses from SCT's management.

Current support: The first major area of concern comes from the IA installed base of users, numbering over 400, and has to do with maintaining support levels. Is it likely that IA clients will be made to feel like "stepchildren" in the new SCT environment, having to compete for support with existing SCT clients?

SCT's response: In terms of current software, SCT is fully committed to maintain both IA and SCT clients. The acquisition of IA's knowledgeable staff of more than 200 people will allow SCT to follow through on that commitment. We understand very well the loyalty of IA clients; many of them have lived through a series of transitions. We intend to nurture that loyalty by continuing to provide excellent service and support.

Future directions: The second major area of concern is about the future. The major question is whether the new development directions that IA had been promising its customers, principally in client/server technology, will be continued and supported by SCT, and if so, in what form.

SCT's response: In terms of futures, there are four major IA product development efforts that SCT evaluated: *IA-Plus*, the latest IA software running on the RDB relational database management system in a DEC VAX environment; *IA-Plus*, the latest IA applications software running on the DB2 database management system in the IBM mainframe environment; *EDI.Smart* which allows the electronic transfer of student transcripts; and *NewGen* which is the next generation of IA software, made for a client/server environment. Of these four, the first is being discontinued. The next two are viewed by SCT as strategic products, and will therefore, receive full development commitment. The fourth, *NewGen*, as a specific product is also being canceled, but a migration path for both IA and SCT clients is being planned which will incorporate many of the design features of *NewGen*, including client/server. SCT has chosen the name *BANNER2* for this product (BANNER is the name for the current SCT relational DBMS-based software).

BANNER2 is anticipated to be available in late '93 or early '94 with the first phase of a graphical user interface (GUI) and most of the client platforms supported. It is currently expected that full GUI and all planned client platforms will be available in late '94.

SCT knows this choice of a name for the new product has caused some concern for former IA clients, thinking, perhaps, that *BANNER2* means that the next generation is really *BANNER* and not what they know as *NewGen*. However, IA's communication to its clients was that there would be a substantive migration effort to move from its current product line to the new client/server product. SCT's obligation to *BANNER* clients has been that the move to the next generation of technology would not require a major conversion effort. Even though SCT is merging the technology research from the IA *NewGen* product into *BANNER* to create *BANNER2*, it will be relatively easy to migrate from *BANNER* to *BANNER2*. Had SCT chosen a different name, they would have sent the wrong signal to *BANNER* clients; that is, they may have concluded that *BANNER2* was a completely different product and that SCT had not kept its obligation to have a seamless migration. Former IA clients, on the other hand, should be expecting change and therefore should be less disturbed by a name change than *BANNER* clients would have been.

Transition issues: It is reasonable to expect some bumps along the way to a full integration of the two companies, but should either current clients or potential clients be concerned about major disruptions? Should institutions that are in the process of acquiring software right now wait until things become more stable?

SCT's response: Most of the transition difficulties are over. The two management teams worked very hard to come up with a new organization that would effectively blend the existing staffs into a cohesive whole, and everyone has been very enthusiastic about it. All of our teams: the sales force, marketing, software development, and client services are prepared to respond to particular client needs, whether that is answering an RFP or fixing a bug in a program. ■

Decision-Making for Academic Computing: the Cascade Effect ...

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What went wrong here? Certainly not the fact that there was disagreement about what to do. It is natural and understandable that reasonable, intelligent people will have different points of view, and come up with different solutions to a problem. What really went wrong was not that there was disagreement, but that there was no process in place to work out the disagreements in a productive way—beginning with a consensus on what the problem was that they were trying to solve—and to then be able to present a persuasive, unified proposal for the administration to decide whether to fund.

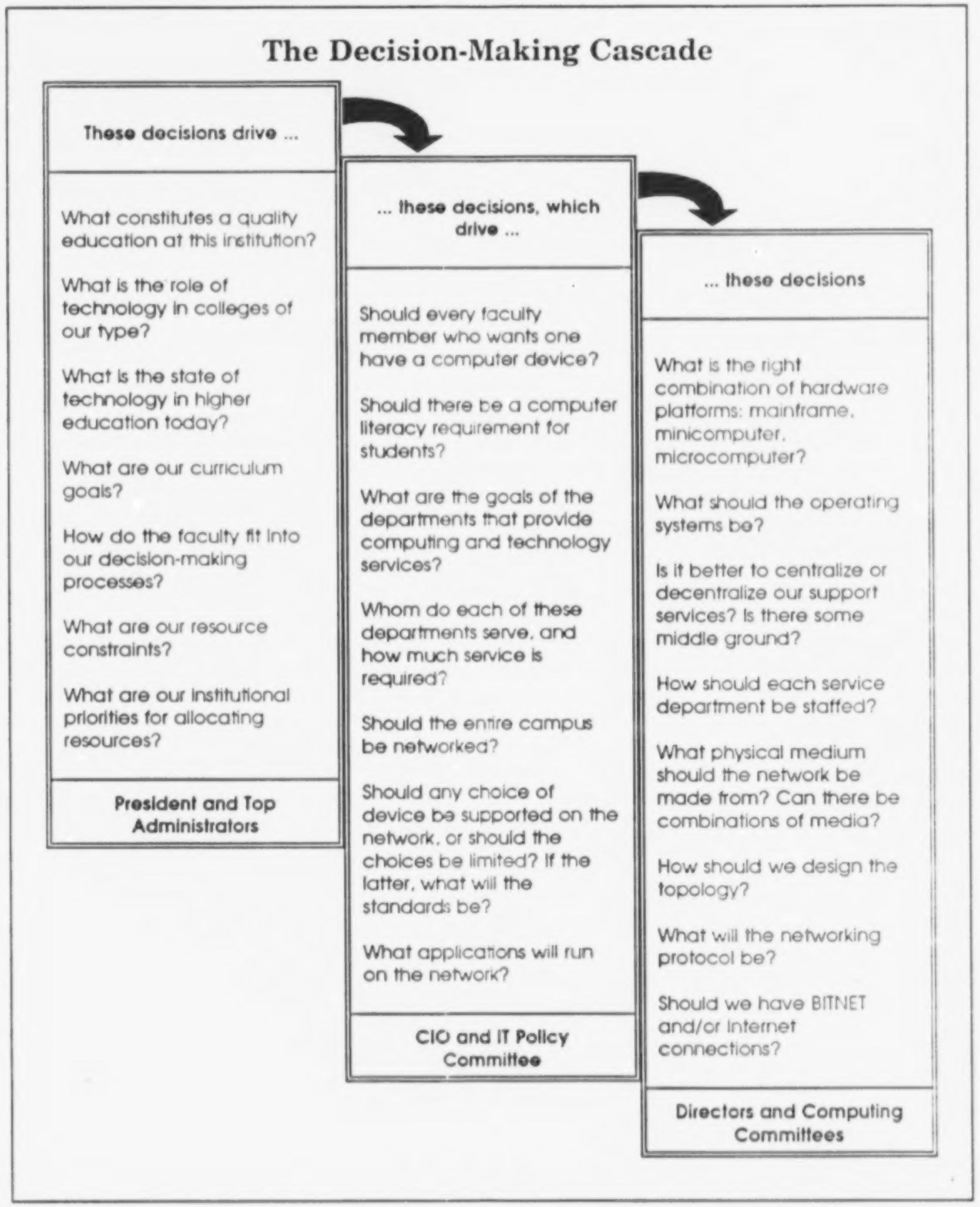
Without this process, the administrators who make resource and funding decisions are put in a position of having to sort out and weigh the arguments in favor of one option or another; most administrators do not feel technically qualified to do so. Typically, administrators at this level do not have a technical background, and need to rely upon a trusted and credible process to bring forth proposals for academic computing which include cost-benefit analyses presented in educational terms. If they don't have such a process, they will either put off making a decision indefinitely, or they will take the option that they do understand—the one that keeps the short-run costs down, even though that may not be best for the college in the long run.

This kind of thing happens all the time. Should we install a fiber-optic network or continue to rely on the twisted-pair telephone wiring already linking the campus? Should we put PCs or Macs in the new computer lab? Should the VAX run VMS or Ultrix? These discussions tend to leap to specific implementation solutions without first defining what the problem is, and without the critical link back to educational goals. Too often, these decisions are made because the proponents of one option or another are more articulate or have a technical background that others tend to rely on.

But these are not really technical decisions. Or, at least, their technical components are at a lower, detailed level. The much more important components of these decisions occur at a different level, and need to be addressed first.

How to decide what to do with the VAX and its maintenance? By understanding first what the educational goals of the faculty are and relating those goals and objectives to needs that the hardware and software have to fulfill, and then by developing a set of meaningful and specific criteria against which each option can be evaluated.

Let's take the discussion about whether the VAX should be replaced with another VAX or by an IBM RS/6000. While it is certainly possible to go into a lengthy discussion of the different architectures, the bus speeds, the interoperability of each of the available peripherals, and so on, none of those issues matters *in and of itself* in making the final decision. What really matters is how well each of those systems stacks up against what the college needs it to do. What difference does it make that the RS/6000 is a RISC machine if what the faculty needs is the VMS operating system because that is what is required to run their instructional software? What difference does it make if one system is much faster than the other if the actual difference to end users will be measured in nanoseconds? The technical differences between these two options only matter if the differences directly relate to the educational needs of the college as expressed by the faculty. In other words, the discussion should be centered not on what is important technologically, but what is important educationally.



The Decision-Making Cascade

These decisions drive ...

What constitutes a quality education at this institution?

What is the role of technology in colleges of our type?

What is the state of technology in higher education today?

What are our curriculum goals?

How do the faculty fit into our decision-making processes?

What are our resource constraints?

What are our institutional priorities for allocating resources?

President and Top Administrators

... these decisions, which drive ...

Should every faculty member who wants one have a computer device?

Should there be a computer literacy requirement for students?

What are the goals of the departments that provide computing and technology services?

Whom do each of these departments serve, and how much service is required?

Should the entire campus be networked?

Should any choice of device be supported on the network, or should the choices be limited? If the latter, what will the standards be?

What applications will run on the network?

CIO and IT Policy Committee

... these decisions

What is the right combination of hardware platforms: mainframe, minicomputer, microcomputer?

What should the operating systems be?

Is it better to centralize or decentralize our support services? Is there some middle ground?

How should each service department be staffed?

What physical medium should the network be made from? Can there be combinations of media?

How should we design the topology?

What will the networking protocol be?

Should we have BITNET and/or Internet connections?

Directors and Computing Committees

Furthermore, the question of the VAX replacement should not be taken in isolation. Almost always, decisions about hardware should be driven by decisions about software: what software, for which users, needs to be supported on the new system? Similarly, questions about software cannot be answered without knowing what the needs of the faculty are. In other words, faculty needs should drive the software decisions, and software decisions should drive the hardware decision. So trying to decide what system to choose to replace the VAX with (or even deciding that the VAX should be replaced at all) is going about it backwards.

What should have happened at this institution was for the academic computing committee to develop, based on their communications with the faculty about their educational goals, a list of specifications that the new system had to fulfill, including the curriculum to be supported, any particular software interests that the faculty had, any need to store and access some amount of research data, the likely number of users that would need to use the system concurrently, the applications that would run on the hardware, the ease of learning and ease of use of the system that was required by both faculty and students, estimates of future load and growth patterns of usage, how much support would be needed from the hardware vendor, the complete cost of the system, and so on. Once this list was developed, each option for replacing the VAX, including another VAX, the IBM RS/6000, a series of networked microcomputers, and any other option that anyone thought of could have been evaluated against each criterion.

If this process is followed, a solution will emerge in which everyone can feel confident. The solution will be directly tied to the college's educational goals because the process will begin with the faculty, there will be a full examination of all of the relevant alternatives, and the chosen direction will be fully justifiable. At that point, a proposal based on that solution should be a relatively easy task for the administration to evaluate.

The Cascade Effect

The cascading of decisions depends on two things: the right people being involved at the right levels, and the sequencing of decisions so that choices made on one level drive the decision-making on a lower level.

The reason this works is that people throughout the institution are making decisions at the level of issue at which they feel most comfortable. That is, rather than the president or the provost trying to decide whether the institution should have its own Internet connection, they are dealing with the major educational issues (Should we have a computer science major? Should we emphasize teaching over research? Do we need to reduce the cost of instruction? etc.) that will determine (by others) the degree to which the Internet is needed and is a justifiable expense.

Technology for its own sake is no longer a viable direction, if it ever was. The decision-making cascade will ensure that there is a direct link between each technical choice and the overall goals and objectives of the institution. ■

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Coping With Vendor Demos

You've gone through all of the right steps so far in the process of selecting a new administrative information system, and have narrowed the large field of choices to two or three of the most interesting and appropriate systems. You have asked the vendors of these systems to do an on-campus demo for you, for your committee, and for various others on campus who have a stake in the outcome of this major decision. The question now becomes how to make the best judgements about what you will see in the demos.

The demos are an excellent source of information about the systems, but they can also be very confusing, especially if two or three are done in a short space of time. Each vendor typically wants two or even three days for their full presentation, and by the time they are all over, the campus participants may be shell-shocked and bleary-eyed. What are the important issues to focus on, and how do you sort those out from everything else you will see?

We have talked in these pages about creating a script for the vendors to follow (July 1991), both in order to have a better opportunity to do an apples-to-apples comparison among the vendors and to make sure that the vendors are prepared to show you the particular features you want to see in the systems when they are on campus. This is especially important if there is a question or confusion about whether a system will do a certain task, and if it does, what it looks like.

Beyond the script, there are a few important issues to keep in mind as you are watching the demos and thinking about them afterwards. While seeing a demonstration of a system is a unique opportunity to gather information unavailable in any other way, it is important to be clear about what you are seeing.

The quality of the demonstration versus the quality of the software. These can be very hard to differentiate, but it is important to do nevertheless. Because the visual and aural impact of the demo itself can be large, not to mention the style of the demonstrator, transferring opinions about the demonstration to the actual software needs to be done very cautiously. A bad demo could be the result of factors other than the quality of the software (malfunctioning audio-visual equipment, an underprepared demonstrator, a faulty modem, even a late plane), just as an exciting demo and an enthusiastic, knowledgeable demonstrator may obscure serious flaws in the system (not necessarily intentionally, although that could happen too). On the other hand, the quality of the demonstrations, including the attitude on the part of the demonstrator, should not be discounted entirely since it may tell you something about the service and support you can expect from the vendor later on.

> *Each system will have a different look-and-feel. The way you respond to a particular look-and-feel probably indicates a certain comfort level later on when the system is in actual use. But you need to look behind it also, since it may camouflage both benefits and flaws in the system itself.*

The power of the system versus the complexity of the system. These two are often trade-offs with each other; what might look dazzling in a demo because it's so powerful may in fact turn out to be too difficult for everyday use or for a broad base of users.

Cosmetics. Each system will portray a very different look-and-feel. In one sense, the way you respond to a particular look-and-feel probably indicates a certain comfort level later on when the system is in actual use. But you need to look behind it as well, since a system's look-and-feel may also camouflage both benefits and flaws in the system itself.

Relative costs. There is usually a more or less large disparity in costs among the systems you look at. While costs usually won't be directly discussed at the demos, they will offer another chance to evaluate whether there is a direct relationship between costs and benefits in each system. That is, is the most expensive system proportionally better than its competitors?

Overall system architecture. You will get a much better feel for the architecture of the system during a demo than you ever could by just reading about it. There are three things to look for during the demo: the integration of various system functions; the amount of data redundancy; and the consistency in approach to all of the system's components as seen by the way in which the system is navigated, the actual user interface, the way things are named, and so on. For instance, if purchase orders in the finance module and pledges in the alumni/development module can both be numbered automatically, is it done the same way in both places?

Each of the systems will have these features built into their architectures to varying degrees. You need to judge whether more or less of each feature will affect your working with the system.

Ease of use. This is usually one of the most important criteria in choosing a new system, and the demo offers a great chance to evaluate it. How easy is it to get to individual records? How easy is it to select groups of records? Is the system navigation easy to manage? Is the on-line help feature really helpful? Keep in mind that many different kinds of people will be using the system, from a variety of backgrounds, and with varying levels of interest and expertise. Will the system serve them all?

Querying and report writing. This is another extremely important feature for every new system, and should be very high in everyone's priorities in terms of evaluation of the options. You need to make sure this is one of the features actually shown during the demo, and further, to make sure the tool being offered is actually usable by end users, as opposed to the programming staff in the computer center. The demo is a good way to get a feel for how these kinds of tools work.

You will especially want to see ways in which data from different parts of the system can brought together for either printed reports or on-screen queries.

Ease of modification. You need to get a sense of system flexibility during the demos. Every system will have to be changed in some ways to meet your specific needs. It is important to see the ways in which the system being demonstrated can be modified, including such things as adding new data elements and changing standard report formats.

Other. None of the vendors will follow your script to the letter; nevertheless, you need to reach a certain comfort level that the features you ask to see are actually in the system. In addition, it is likely that each of the vendors will be asked for more information or some follow-up. Whether they all respond, and in what manner, should also be evaluated. ■

> **"There will always be some people who copy software without compunction. The point is to be certain that educators and students alike realize that such people are not romantic software revolutionaries. They are simply criminals. If the laws are wrong, would-be lawbreakers should lobby to have the laws changed...not simply take another step toward declining values. By not speaking out against and by not punishing the guilty (software pirates), we are, by default, condoning their actions, and punishing the innocent (software authors and future software users)."**

Robert A. Strikwerda and John Minor Ross
Indiana University at Kokomo
"Software and Ethical Softness"
Collegiate Microcomputer
Autumn 1992

In Future Issues

- *The long-term effects (and dangers) of downsizing*
- *What makes software award winners different from other faculty?*
- *Ethical issues in computing center management*

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EDUTECH RESPONDS

Q. It seems that more and more faculty want their own computer these days, but, like everyone else, our budgets are limited. How can we keep the faculty enthusiastic about computing without automatically granting every request?

A. *The issue of microcomputers for faculty is typically a contentious one on most campuses, with opinions ranging from the sense that computers are so fundamental to the academic enterprise that every faculty member who wants one should automatically get it to the other extreme of a rigid cost-justification needed for each and every purchase. One process that seems to work well is to have an Academic Computing Committee receive faculty proposals and decide which to fund. We think it makes sense for faculty to have to make their case for computing support to other faculty, since there is more likely to be a common understanding of the educational goals to be achieved. You'll want to make sure that the committee is made up of representative faculty, that it has a yearly budget to work with (with the amount determined by the IT Policy Committee) to fund the proposals it receives, and that the criteria by which the committee makes its decisions is communicated to the entire faculty on a regular basis, along with the final decisions about which proposals are funded.*

Q. We would like to increase the numbers of microcomputers on campus employed by both faculty and administrators, but are finding it very expensive. We think there may be some use for older computers, especially for new users, but we wonder if it's really right to give obsolete equipment to anyone, even someone whose needs are not very sophisticated.

A. *If there is any rule of thumb about microcomputers today it is that all cost-reduction and avoidance techniques should be used whenever and wherever possible. The one thing we know for sure is that the standards are moving more rapidly forward than any of us feel comfortable with. What is current today is obsolete almost literally tomorrow. Therefore, leasing, reusing older computers whenever possible, adhering as much as is reasonable to a standard configuration, and buying upgradeable microcomputers should all be employed. Obsolescence is a relative term; what's important is that the equipment fills an existing need.*

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THE EDUTECH REPORT

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New Leadership at EDUCOM

Interview with Robert C. Heterick

Dr. Robert C. Heterick, Jr., Vice President Emeritus at Virginia Polytechnic Institute and State University, will become the new president of EDUCOM on January 1. Despite a crowded schedule at this year's conference in late October, Bob kindly consented to an interview with us, to share some of his thoughts on the future of the EDUCOM consortium.

ER: *You have had such a long and distinguished career in higher education, including a wide variety of both academic and administrative positions. Why EDUCOM and why now?*

RH: Well, you probably know that the state of Virginia went though some pretty extraordinary budget cutting, and one of the consequences of that was an offer of an incredibly attractive early retirement; having spent 30-plus years in the system, it just looked too attractive to turn down. The EDUCOM position came along about the same time that I was free and available; a number of folks encouraged me to do it, and it sounded like a good idea. Realistically, the opportunities and the challenges are pretty significant for EDUCOM right now. EDUCOM is going to feel the ripple effect of what's happening in both industry and higher education, and I think it's better positioned than any of the other information technology organizations to really have an impact.

ER: *Why do you think EDUCOM is uniquely positioned with respect to other organizations?*

RH: Just look at the messages from the President on a number of initiatives that mention EDUCOM; clearly EDUCOM has had a significant impact on the national network scene. It's done the best kinds of things an association can do: it has brought collaborators together into a forum to discuss their ideas; it has produced intelligent ideas;

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"Universities are plagued by caste distinctions that inhibit teamwork. Faculty treat non-faculty colleagues with disdain, professional librarians act like a medieval guild, and computing professionals consider technical knowledge the only measure of worth. The cultural divide between the humanities and the sciences is well known, but an equally deep divide lies between scholars, librarians, and computing professionals."

William Arms
Carnegie Mellon University
As quoted in "Scholars Urged to Collaborate in Today's 'Technology Revolution'"
The Chronicle of Higher Education
October 28, 1992

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NEWSBRIEFS

ON-LINE NEWS FROM THE LIBRARY OF CONGRESS

Through a new system designed to reach people outside the Washington area, the Library of Congress (LC) is offering a new, free, on-line service that gives users information about library programs, exhibitions, activities, and job postings. Users can dial into the free system with any computer that has a modem. The service contains items of interest to the media; information of particular interest to librarians, such as news from the Cataloging Distribution Service of new products, Collections Services, new LC publications, changes in LC procedures in cataloging and other areas, major personnel appointments, and professional meetings; and news for the public such as exhibit openings and features on the Library. It also includes download capability. The service contains edited versions of stories from the library's newsletter, *Information Bulletin*, as well as announcements; however, it does not provide access to bibliographic or other library services.

To use the service, which is available 24 hours a day, dial (202) 707-3854 through the computer. For more information, contact Guy Lamolinara, Editor, Library of Congress News Service, Library of Congress Public Affairs Office, Washington DC 20540; (202) 707-9217.

USER ASSISTANTS SERVE HAMBURGERS, TOO

No more the familiar computer center lament, "We can't hold onto our student user assistants; they can earn more working at McDonald's!" Now the user assistants can do both. A McDonald's near the main campus of the University of Houston is offering students the use of microcomputers, copiers, and FAX machines along with their hamburgers and fries. Students pay to use the equipment, and the restaurant employs other students to help them out. This McDonald's also offers a video arcade and television news broadcasts.

THE MAGIC OF MULTIMEDIA

A satellite broadcast on using multimedia in higher education is scheduled for February 23, 1:00-3:00 p.m. (EST). Offered by the Institute for Academic Technology (IAT) at the University of North Carolina (funded by a grant from IBM), the broadcast will focus on using the computer to combine video, text, sound, still images, and graphics to enhance learning and teaching across the curriculum. The broadcast will be interactive, and will feature topics such as whether using technology makes sense in today's tight economic climate. There will also be demonstrations of interactive applications in foreign languages, medicine, and other areas. The IAT was created to support the innovative use of computer technology in higher education.

The satellite broadcast fee is $250 per site; the registration form and fee are due by February 9. For more information, contact Barbara Bickell at (919) 560-5031.

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Who's NeXT?

by Rick Blum

(With apologies to Abbott and Costello....)

Hello, sir. Welcome to Lotta Computers and our one-day, 50% off everything sale. I'm Mr. Ram. How can I help you?

Hi, I'm the purchasing agent for Costello Community College. Can you tell me what your most popular word processing software is?

WriteNow.

I'd appreciate it.

You'd appreciate what?

I'd appreciate it if you'd tell me the name of your most popular word processing package.

WriteNow.

Yes, right now.

That's right.

What is?

You just said the name of the software.

I did? What did I say the name of the software is?

Write Now.

I don't understand you. I ask a simple question, and you keep putting me off. Tell me your most popular word processing software.

WriteNow.

There you go again. Listen, maybe we should skip the software and decide on hardware, instead. Can you recommend something that's designed for an educational setting?

NeXT.

Hold on. You can't talk to other customers until you answer my question. Now, tell me a hardware platform that is right for our college.

I did tell you. NeXT.

If you don't know the answer, why don't you just say so instead of trying to get rid of me?

I'm not trying to get rid of you. I'm just recommending a good workstation that's designed specifically for colleges and universities.

Then what is it?

I told you. NeXT.

Fine. Have it your way. I'll just go across the street to Notmenny Computers and do my business there.

Please don't go. Educational institutions are very important to Lotta Computers. Let's try again. What exactly is it you need to decide?

I need to decide on our next computer and right now.

I'm sorry, but they don't work together.

What doesn't?

The hardware and software you just named.

How could I? I don't know a thing about computers! I have an idea. Why don't we forget all this hardware/software stuff for a minute and instead just pick an established company with a wide range of products. What do you say?

I'd say that's Bull.

Excuse me! I admit I don't know much about computers, but you don't have to insult me.

I would never do such a thing. Let's pick another company if you don't want Bull.

I certainly don't.

OK, no Bull.

Good. Would it be a good place to start by asking what the best PC is that you carry?

Sure. I'd say that's Wyse.

Well, thanks. I take pride in choosing only prime products for our students.

I'm sorry, but you can't get a Prime PC anymore. You should get Wyse.

I'm getting pretty wise to you, buddy. Look, all I want is a good PC.

That's easy. The choice is Wyse.

Great. Half an hour and all we've decided is to make a wise choice. I can't wait to find out what's next.

It's a workstation specifically designed for colleges and universities.

How did we get back to workstations?

You mentioned a brand. NeXT.

I'll move on, but this is your last chance—put together a system with the works and, if the price is right, I'll make out a check today.

I'd be happy to. But if you want the Works, there's no reason to buy WriteNow.

But you said the sale is for one day only. I'd like to buy right now.

I'll sell you anything you want. But I warn you, WriteNow won't work on Wyse PCs, if that matters.

The only thing that matters is to get out of here so fast you'll think I had wings.

Well, if you want Wingz, forget about the Works. We'll put everything on a Mac rather than Wyse and I'll give you Word, instead.

Oh yeah? Well, here's my word—Good-bye! ■

Rick Blum is a free-lance writer; a version of this article first appeared in Computerworld.

Interview with Robert Heterick ...

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it has arranged for testimony before Congress; and it has encouraged folks on the Hill to understand the importance of these initiatives for higher education. I don't see another association out there that's been able to exercise that degree of influence.

Now, that's in one area. There are many other areas that EDUCOM needs to operate in, but it has certainly demonstrated in that one area that it can get the attention, it can focus those resources, and it can really get a result.

ER: *What are some of those other areas? EDUCOM has been doing a lot of soul-searching this past year or so, using focus groups and engaging in strategic planning. Is your thinking about the other areas that EDUCOM needs to focus on a result of that?*

RH: Yes. I think the process EDUCOM is going through is a very useful one. I think it's done two things: it has produced a recognition on a number of people's parts that what EDUCOM has been doing have been the right things and that it has been working in the right areas. In addition, it has probably sharpened some people's attention to the fact that it hasn't been doing all that it should have in some of those areas.

Now, while I think the national network effort has been really successful, the other major activity which, in the long run, may be at least as important, is to do something about the way we teach and learn in our institutions of higher education. EDUCOM has done many good things to start grassroots activities there, but it hasn't had the kind of national impact that it's had on the networking side. So I think there's a better understanding now that EDUCOM needs to create the same kind of effort to produce results on the teaching and learning side as it's done on the national networking level.

Organizations like EDUCOM don't have a bottom line; they're collaborations of other organizations, and so they really are change agents. The critical issue for them is to bring about the change that their constituencies are looking for but are unable to bring about individually. And in that regard, you measure the success of an organization based on how many of those changes it has been able to bring about. EDUCOM is not a membership organization that provides a large number of individualized, personalized services to its members, because its members are the academic institutions themselves and its corporate associates. So what it does is to bring those groups together to leverage their resources and to focus attention to create change.

ER: *At fewer than 700 institutions, out of a possible 3300 or so just in the U.S., do you think that EDUCOM has enough members?*

RH: It's hard to know what's enough. There are several ways you can measure that. EDUCOM has always been focused on the leading edge and the early adopters of information technology as it has tried to push the frontiers. In that sense, the size of its membership is pretty representative of that group. It would be nice, and one would think that at some point in time we will do this, to try to target all of those institutions. But in point of fact, a lot of those are small institutions with no internal focus on information technology, nobody to really join on the path; historically, those institutions have demonstrated a lot of churning. You get one of them to join an organization like EDUCOM or CAUSE or ACIS, or something like that, and the next year you discover you're spending more money and effort and resources keeping their membership than they're paying in dues. I think the question is, where do you focus and when. I think there will come a time in the future that EDUCOM will need to have a much larger representation of those organizations; now, I think its focus is probably about right.

ER: *Doesn't that leave EDUCOM open to charges of elitism?*

EDUCOM's Strategic Goals

The following are goals developed by the EDUCOM Strategic Planning Task Force and approved by the EDUCOM Board of Trustees:

1) Provide effective national leadership for the development and use of applications of information technology in higher education.

2) Assist in creating a national information infrastructure with a rich array of electronically-sharable educational- and research-oriented resources supporting collaboration among communities of scholars.

3) Stimulate innovation in the use of information technology in classroom- and laboratory-based instruction and learning and promote the use of information technology to support the transformation of institutions of higher education through their development of new paradigms for teaching and learning.

4) Advance the common interests of libraries and other information service organizations within higher education.

5) Provide ideas and resources to support higher education institutions in their use of information technology.

6) Explore with Corporate Associates a common strategy to work in partnership with higher education to achieve its mission.

7) Organize and operate EDUCOM as an exemplar of good management practice.

RH: I hear the accusation of elitism quite a bit, and I guess there's elitism and then there's elitism. EDUCOM is a self-selecting group of schools who have defined information technology as a major component of their strategic endeavors; in that sense, you can call them elite, because that definition certainly doesn't incorporate every institution. The fact that the models that flow out of EDUCOM publications tend to be those institutions, somewhere close to the leading edge, is not at all surprising. And I don't find that really a negative. There are certainly a number of quality institutions that are doing interesting things in information technology that don't participate in EDUCOM as actively as I would like to see, and I'd like to encourage them to participate. But to suggest that EDUCOM would, at this stage in its life, spend a lot of time trying to convince the small liberal arts college that does absolutely nothing with technology that technology is important to them, does not strike me as a good use of resources. EDUCOM is the kind of organization you come to when you realize that information technology is strategic. EDUCOM is not, at this stage in its life, going to reach out and evangelize the people who haven't seen the need. But please understand, every organization has an ebb and a flow, and if we sit here next year, I might tell you something different.

ER: *But you do see a role for EDUCOM in terms of evangelizing faculty on current EDUCOM member campuses who haven't yet embraced information technology?*

RH: I think that EDUCOM needs to reach presidents, provosts, and chief academic officers to provide them both with the information on what's happening in the community outside their own institutions and with the encouragement for them to make changes in their own organizations. Now, presidents and provosts don't change organizations by themselves; institutions of higher education typically include faculty in the change process. So it's clear you need to reach the faculty to give them an awareness of what is out there and what their colleagues are doing. There are no established journals that a faculty member looks to if he or she has some interest in applying technology to the teaching venue, although research is a little simpler now, because you tend to see a lot about technology in the research journals.

So, yes, there's a role for EDUCOM with the faculty, as well as a role with the administration, and both are important. You have to remember, EDUCOM, like many of the professional associations in Washington, is kind of a small organization. You take out the BITNET support part, and you're looking at a dozen or so people. I think you have to make some choices about where you apply the time of those people, and from my standpoint, the places chosen so far seem reasonable.

ER: *Do you see forging further alliances with other organizations, such as the one you have now with CAUSE and the Association of Research Libraries?*

RH: Absolutely. We want to set the right example. We don't want to preach collaboration to our campus members and our corporate associates and then turn around and not be able, in a similar way, to collaborate. That just wouldn't make sense. I think there are a number of organizations, CAUSE being the most evident one, that have similar constituencies and similar kinds of charters, with which we can clearly leverage our resources even more.

ER: *Any thoughts of going a step further and resurfacing the idea of merging with CAUSE?*

RH: I'm not the person who can speak authoritatively on that. Give

Interview with Robert Heterick ...

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me a couple of months, and I'll understand the situation better. I do know that the planning groups of the two boards have met and have discussed the question of the appropriate kinds of relationships that leverage our resources. And my understanding is, at this point, that there is not a sense that a formal merger of the two organizations is in the cards. Now whether that will change next year or the year after, it's hard to say.

ER: *When you talk about collaboration and leveraging resources, it sounds very much like what is happening on many campuses. Do you foresee a time for all colleges when a single chief information officer will have responsibility for all of an institution's technology resources?*

RH: I don't think "chief information officer" is a reasonable title in the way we organize our institutions. It strikes me as a corporate title that is much less meaningful in higher education. In our institutions, we have it pretty well established that we have a president, a provost or a vice president for academic affairs, and a finance vice president. As a matter of fact, we came out of the second world war with essentially that tripartite structure, with the president and two operating officers reporting to the president. Since then, we've seen both the student affairs people and the development people coalesce into broader and higher positions, but those people don't have titles that came out of the corporate world; they often hold deanships or whatever is the appropriate cultural title. I think that's what we're going to see in information technology.

In the corporate world, CIOs tend to have an authority to construct systems and procedures and organizations to accomplish the line missions of their companies. In the academy, that's never going to happen. The kinds of things we're talking about when we talk about information resources and technology are support services, not line activities. So universities are going to continue to be dominated by the academic missions of teaching and research and to some extent, outreach. For some institutions, the IT person will be someone called "vice president"; for other institutions, it will be someone called "dean"; for many institutions, it will be someone called "vice provost." In some institutions, these may turn out to be staff positions with responsibility for combined planning, but the units that do the operations themselves will still remain disparate.

As a matter of fact, one can make the argument that what we are trying to do with this technology is to empower people within an institution. And if we really are very successful at that, one of the consequences is that our service organizations will fade into the woodwork and become transparent, and the people will distribute out into the organization itself.

Although I have a number of colleagues who have that term as part of their title, we don't have a good definition for what it means in higher education. If you're the CIO, do you have responsibility for all information? If so, that must mean you have responsibility for the libraries, the archives, and a whole series of things that are beyond where we normally use that term.

ER: *Are there projects underway in EDUCOM that you are particularly interested in? Or projects coming down the road that you want to usher through personally?*

RH: I think the whole domain for current EUIT (Educational Uses of Information Technology) activities is one that's very interesting to me. The real question for higher education is, why are we spending more and teaching less? We are dealing with public reaction to tuition and fee costs that double the Consumer Price Index year after year. And it's very clear that the process that our corporate colleagues have been going through is one that we are going to have to go through also.

We're going to have to find ways to be less labor-intensive. I have used the term "disintermediation" to mean getting the human mediation out of the process and get into more technology-mediation. Technology has a set of price points that really look attractive; they're going down every year, as opposed to personnel costs which are going up every year. Clearly the big issue for institutions of higher learning is to teach both more and better for less, and that's what EUIT activities are focused on. That's the exciting area for the next three to five years. One of the things that EUIT has tried to do is to emphasize that there are people making headway on these problems. However, the headway we've made so far has been primarily in the domain of increased effectiveness—better teaching, not necessarily more productive teaching. So productivity is an area that's most interesting.

I think you're going to see a lot of focus in EDUCOM over the next year or two on the kinds of things embodied in Project Jericho. *[This project is for the purpose of exploring ways to bring down the walls that serve as barriers between faculty and information technology resources.]* One of the issues we have to deal with is not with the faculty itself, but with the academic officers and presidents in understanding that we need to change the reward structures within our institutions. We need reward structures to encourage the faculty to really do those kinds of innovative things they're so good at relative to the teaching process. So I think you'll see the Jericho idea expanded beyond just doing something with the faculty, but also looking at finding ways to help educational institutions change their reward structures.

ER: *Why do you think it's taking so long for the message to get through? Changing the reward structure for faculty is something that we, as information technology professionals, have been talking about for years as the obvious way to be able to exploit technology for the benefit of our institutions. Why isn't that message getting through loud and clear? Or at least, more than it has up until now?*

RH: I think colleges and universities have incredible inertia. There was an interesting report a few years back in which it was observed that there were 66 institutions that had come forward since the year 1530 in a form that was still recognizable today. Two were churches, two were governments, and the other 62 were institutions of higher education. We have been amazingly resistant to change. One of the great difficulties, and one of the reasons that strategic planning is so important, is that what we have accomplished in higher education in the U.S. today is the envy of the world. It is clearly very, very good. And it's hard to mess around with something that has been very successful for a long period of time and is envied by others.

The thing that we have to get into our heads is the fiscal stress; the kind of exponential growth so many activities demonstrate—teaching being one of them—is not consistent with our country's resource base. You could make the argument that we were closer to universal higher education fifteen years ago than we are today, as we see ourselves drawing back state and federal money and diverting it to mandated programs, health care, prisons, and that sort of thing. We have to know we need to change before it's apparent, because if we wait until it's dead apparent, it's really too late.

EDUCOM has a significant role to play in higher education. We have an awful lot of people in our inertia-bound institutions who say, wait a minute, we're the best in the world. If it ain't broke, don't fix it. Well, even being the best, we can be better. ■

"Policy statements may never solve computer ethics problems. Many computer center directors will attest that during the past three years their campus has developed a computer use policy. Only a minority of directors can boast, however, that as a result of the policy, they have reshaped the campus' thinking and reshaped the campus' behavior.... Those faculty, staff, and students who do read the policy interpret it through their own system of thought, through their own cultural lenses. Policies are only the beginning of managing the problem. The key is proactively educating faculty, staff, and students about legal and ethical use of computing resources."

Sue Stager, reporting for a panel discussion
Indiana University
"Computer Ethics Survey"
SIGUCCS Newsletter
Summer 1992

In Future Issues

- *What makes software award winners different from other faculty?*
- *The long-term effects (and dangers) of downsizing*
- *Ethical issues in computing center management*

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EDUTECH RESPONDS

Q. We are just starting a project to acquire a new administrative information system, and have some disagreement about the process. Is it necessary to go through the development of a formal Request For Proposal?

A. *No, but there are steps in the development of an RFP which you will likely find very useful. We all have a tendency, true for computer people in particular, to leap ahead to solutions before fully defining the problem. The essence of an RFP is the needs analysis, created through a process of collecting, understanding, and reaching broad-based agreement on the institution's needs for a new system and the purposes to be served by it. This process can be difficult and time consuming, but is well worth it for any number of reasons, including preventing second-guessing later on after the system decision is made. By the way, this doesn't have to be just for administrative software. Every major computing-related acquisition, whether hardware or software, whether to serve academic or administrative needs, and whether for something new or for a replacement for something already in existence, can profit from a thorough needs analysis. Taking the next step to write up a formal RFP (unless you are required to by your institution or other rule-making body) is not as important.*

Q. We are just forming an Academic Computing Advisory Committee for the first time, and all of the folks who have volunteered to be on it are good, knowledgeable, computer-literate faculty members. Are there other things we need to keep in mind in the make-up of this committee?

A. *The committee should be made up of representative faculty, in the sense that the members will represent the faculty as a whole. It is certainly good to have computer-literate faculty on the committee, but the problem with having only such people is that it leaves out a significant group of faculty: potential users. Some institutions also include the director of academic computing on the committee, but we believe that there should not be any directors in this group. Directors of computing resources should be advised by committees such as this one, and can keep the committee members well-informed on specific topics, but should not be full, participating members themselves.*

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THE EDUTECH REPORT

The Education Technology Newsletter for Faculty and Administrators

Exemplary Leadership and IT Excellence

On December 2, at CAUSE92, Bernard W. Gleason, the Executive Director of Information Technology at Boston College, was presented with the 1992 CAUSE *ELITE* Award for Exemplary Leadership and Information Technology Excellence. The successful twenty-plus-year career of Bernie Gleason (coincidentally, Bernie was given the award on the twenty-third anniversary of his first day at BC) parallels BC's dramatic rise in stature over the last two decades. And according to his colleagues there, Bernie's contributions have played a major role in the university's elevation among the ranks of elite institutions of higher education.

When Bernie joined Boston College, the university was in dire financial straits. Seeing the fiscal problems of the institution as an opportunity—in fact, a demand—for change, Bernie took the initiative in applying technology to problem solving, resulting in some of the most highly innovative solutions in higher education today.

Under Bernie's leadership, Boston College by 1980 had all administrative systems online and totally integrated, with a single system image—a significant enhancement for the administrative operation of the university; was the first major university to have a fully integrated library system, an automated admissions system, and an online student information system; became a pioneer in the integration of voice and data services; was among the first to provide desk-top systems for all faculty and staff with demonstrated need; published a highly regarded strategic plan for information technology with end-user support as its cornerstone; implemented "Project Glasnost," a framework for providing open access to administrative information, with an emphasis on imaginative techniques and a universal ID card for students' use; gained nationwide attention for the design and implementation of

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> **"We need more than a vision of technology, which is a one-eyed vision. We don't want to be like the (no doubt apocryphal) World War II missile designers on the Opposing Team who pleaded, 'All we did was send them up; we didn't know where they were supposed to land.' We have to know where our information technology lands."**
>
> John Gehl
> EDUCOM
> "How to Count a Computer"
> *EDUCOM Review*
> November/December 1992

NEWSBRIEFS

EDUCOM PUBLICATIONS AVAILABLE

Valuable Viable Software in Education: Cases and Analysis, the result of a two-year project of EDUCOM's Educational Uses of Information Technology (EUIT) program, involves the collaboration of software developers, faculty, hardware and software vendors, textbook publishers, university administrators, and computing support staff. Twenty case studies tell the story of the genesis, funding, development, marketing, and use of software that is educationally valuable and viable. For more information, contact EDUCOM at 1112 16th St., NW, Suite 600, Washington DC 20036; (202) 872-4200.

101 Success Stories of Information Technology in Higher Education: The Joe Wyatt Challenge is intended for use as a guide, reference, and planning book for faculty and administrators. Each college and university success story was authored by its primary implementor and includes an abstract, institutional identification, project description, a description of the human and technological resources required for its implementation, the resulting benefits, the critical success factors, and a rationale. Primis, the custom-publishing unit of McGraw-Hill, is making the book available either as a whole, or by choices of story according to institution or discipline field. For more information, contact Richard Levy, Primis Senior Fulfillment Specialist, at 1-800-962-9342.

NATIONAL NET'93 TO BE HELD IN APRIL

The National Net'93 Conference will be held April 14–16, 1993 at the Loews L'enfant Plaza Hotel in Washington DC. Topics to be covered include: Extending NREN's Reach—The Last 10 Yards; NREN or nRen—Can Everyone Benefit?; Campus Deployment—Leveraging the NREN; At the Statehouse—The Focus Shifts; Financing the NREN—Trickle Down or Bubble Up?; Uniting the Nations—The International Scene; and Inside Washington—What's Next?

The conference is sponsored jointly by many of the leading organizations in higher education information technology, including CAUSE, EDUCOM, the Association of Research Libraries, and the Coalition for Networked Information. For more information , contact Elizabeth Barnhart at EDUCOM, 1112 16th St., NW, Suite 600, Washington DC 20036; (202) 872-4200.

CUMREC CONFERENCE TO BE HOSTED BY BAYLOR UNIVERSITY

"Information Technology: The Revolution Continues" is the theme of this year's CUMREC Conference, to be held May 9–12, 1993 at the Marriott Rivercenter Hotel in San Antonio, Texas. The conference will focus on current applications and hardware as well as emerging technologies and methodologies to implement systems for advanced administrative applications. State-of-the-art techniques, evaluation methods, and new tools for developing and utilizing computer technologies will be discussed. For more information, contact Gary Blackmon at Baylor University, (817) 755-2711.

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CWISes: Myth, Mania, or Miracle?

by Howard Jay Strauss, Princeton University

Several months ago, a technology vice president from a prestigious university visited us to see if some of what Princeton was doing could be used at his university. We talked about remote consulting, hyper-maps, client-server processing, image databases, object oriented programming, fiber optic networks, expert systems, networked CD-ROMs, the whole panoply of topics with which people on the cutting edge of technology feel comfortable. For each topic discussed, he acknowledged its importance and added a technical point, more arcane than any already made. This enjoyable game was interrupted when he was asked if his university had a CWIS—a Campus-Wide Information System.

He told us that they didn't and that he could see no reason for one. After all, he explained, budgets and staff were tight, and furthermore, no one was pressing him to install a CWIS.

No one had clamored for us to install one either. In fact, few people even knew what a CWIS was when we installed one at the end of 1988. Our budgets and staff were tight too, but we not only installed a CWIS, we created our own (something I don't recommend). Were we mad, profligate, and off on some technology junket that was irrelevant and unresponsive to student, faculty, and staff needs? No, we installed a CWIS because we knew we had to.

Inventing the future

Of course one must take care of the users' needs, but the fact is that people cannot be relied upon to tell you what they "need" for the future. Before the advent of radio, did people sit around and say, "Gee, it would really be nice if a person in Washington DC could talk to the whole nation at the same time"? It would have been considered madness. Everyone "knew" that it couldn't be done, so no one asked for it.

> *It is taken for granted that a corporate division should do marketing and product planning, but these are generally alien concepts for university departments. It is time that changed.*

Do you have a 700 number yet? You have probably heard of 800 and 900 phone numbers, but a 700 number? They're coming, and they will be your own number, not the number of your house, office, or car, but your personal number wherever you are. You probably haven't written many letters to your phone company demanding this new capability, but it will be a neat thing to have and one day it may seem incredible that people got along without it.

The only test of a new product or service cannot be that users demand it. We—the information technologists—must envision and invent the future of information technology for our users. Then we must lead them there, for they not only have difficulty in imagining where they can go, but they will often be reluctant to give up the security of the present to enter the future.

We saw a CWIS as an essential element in the services we had no choice but to offer. It wasn't a question of whether we could afford a CWIS, but whether we could afford to continue to build our expensive computer and network infrastructure without making some benefits of those facilities universally available. That users (and some of the administration) hadn't yet figured out how important it was made our marketing more difficult, but didn't otherwise deter us. Nor should lack of demand deter you. After all, you will be letting your users hear radio for the first time.

There's no business like show business

Our visitor agreed that being proactive was often called for, but even if his university were to offer a CWIS, which group should provide it: the computer center, the library, or someone else? To determine that, it is helpful to know what business each of these groups imagines it is in.

What business is the computer center in? Go ask them. Do they say the computer business, the network business, the information technology business, or do they tell you it's none of your business? It's not only important that they know what business they are in, but also that they are in the right business.

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Howard Strauss is the manager of Advanced Applications at Princeton.

CWISes: Myth, Mania, or Miracle? ...

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What business is the library in? Silly question? No! How can the library decide what products and services to offer, how to do marketing, and where to deploy scarce resources if they are not in the right business? Are they in the book, journal, and periodical business? I hope not. In fact, any group who imagines that it is in a product-oriented rather than a service-oriented business is in the wrong business and will soon be out of business.

It is taken for granted that a corporate division should do marketing and product planning, but these are generally alien concepts for university departments. It is time that changed. With today's limited funds and the high cost of technology and infrastructure, any department that assumes its importance is assured because it always has been in the past may be in for some bad news. This is especially true of service departments such as the library and the computer center. A CWIS can help. It is an excellent marketing tool and it will cause departments to focus on some marketing and product planning issues.

Fly me to the moon

In the early part of this century, the railroads were sure they knew what business they were in. They were in the railroad business. Who didn't thrill at the majestic sight of a mighty locomotive speeding down twin ribbons of steel that stretched from horizon to horizon? It seemed obvious that people were in love with the sights, the sounds, and even the smells of trains. But in fact, most people had no more interest in trains than they do today in microcomputers, or books for that matter.

People abandoned railroads without a second thought to sip martinis at 30,000 feet while they hurtled through the air at 600 mph in thin aluminum tubes. Did people do this because airplanes were more high-tech than trains? Of course not. They did it because airplanes got them where they were going faster than trains could. What people really wanted was transportation, not railroads. But the railroads were in the railroad business, not in the transportation business, so it never occurred to them to fly people where they were going.

People have no real interest in products at all and they will abandon any product as soon as some other one that is better fills their needs. Nothing is immune. It is hard to imagine a replacement for cars, but it was hard to imagine a replacement for horses before there were cars. Microcomputers, books, food processors, video games, and telephones are all vulnerable to joining hula hoops on the nostalgic junk heap of technology.

> *Microcomputers, books, food processors, video games, and telephones are all vulnerable to joining hula hoops on the nostalgic junk heap of technology.*

Let me entertain you

Is the book business a good business for the library to be in? No! People don't want books. They want entertainment and enlightenment (E&E) and they want it cheaply and conveniently. Books provide that service very well. You can be entertained and enlightened in a plane, at home, in bed, or outside under a tree. As long as books provide inexpensive E&E, books are fine, but if something else provides that service better, books will be abandoned as quickly as transcontinental passenger railroads.

A reasonable business for the library to be in is the E&E business. The library should seek to provide users with all the E&E information they need in the cheapest, most convenient way possible. If that means providing information via computers, networks, newsletters, or skywriting, the library should be prepared to deliver the service. While books may one day fall from favor, people will always need E&E. By focusing on the service, not the product, libraries may change radically (e.g. they may have no books, people may use the library via networks, etc.) while still serving their traditional functions. Once the library realizes it is in the E&E business, a CWIS is one obvious way of providing some of that service.

What business is the computer center in? I'm sure it is not in the computer business or even the network business. A reasonable business to be in is the "access to E&E information" business. That this sounds a lot like the library business is really no surprise at all, but there is a significant difference. If we think of "information systems" as being the vehicles to provide E&E information, then the library might be primarily concerned with the "information" part of an information system, while the computer center's concern might be the "system" part. Of course, either the computer center or the library might reasonably define the entire E&E business as its own.

But where does this leave a CWIS? While either the library or the computer center could "own" a CWIS, an even better owner is the university's communications office (those people who do press releases and that kind of thing). The communications office knows that it is in the E&E business. It has always known how to manage information for the university and has a long history of dealing with every department. It will need some help from the computer center to select, install, and maintain a CWIS, and it will certainly rely on the library for information and expertise in the E&E business, but the university's information office is uniquely qualified to run a CWIS.

If you take installing a CWIS seriously, it will force you to ask questions like, "What business are we in?"; "Who owns university data?"; "What data do we have available?"; "What information do people need?"; "What data is confidential, and how confidential, and who decides?". Getting answers to questions like these is one of the real benefits of deciding to install a CWIS, even before anyone uses it. And a CWIS will get your users asking questions that will change their perception of computing and university information in ways that will have long term benefits to the university.

It's the hard-knock life

Our visitor was willing to accept the "enlightenment" part of the E&E business, but the "entertainment" part gave him a bit of trouble. Universities, after all, exist to pass enlightenment from generation to generation, to seek out deeper understanding of humankind and the world, to extend the frontiers of knowledge, and to boldly go where no man has gone before. Isn't entertainment the frivolous stuff that students, faculty, and staff do on their own time? At best, our guest offered, it is a peripheral interest of the university and should not be the first "E" in the E&E business if it should be there at all.

Yet if organic chemistry or creative writing is not entertaining as well as enlightening, it is a failure of the teachers and students, not of the subject matter. If it is not entertaining, why is anyone learning it and why do we expect that students will not only learn it but revere it?

Unfortunately, a CWIS is not a miracle. It will not make your managers paragons of professionalism, nor make all of your users kind and considerate.

Universities are not forced labor camps. Computer centers, libraries, and all university departments have to market their services. Students, faculty, and staff aren't afraid to work, they just don't want to be bored to death or to be asked to do things that are needlessly difficult. A CWIS can help. It can make information available that will help departments market their services, and when done right, the information will be compelling, entertaining, and interesting.

Miracle of miracles

Many claims and promises have been made about the power and versatility of a CWIS. Is it a myth or have these things really happened? Yes, all the benefits have been seen; they just haven't been seen all in one place. A CWIS has many facets and is like a difficult juggling act. I haven't seen all of the balls in the air at one time—yet. Someplace soon, it's going to happen.

Another concern is that CWISes are just a passing fad. Just because hundreds of universities around the world have installed them would not give me any confidence that doing so makes sense for my university. But a critical thing about a CWIS is that it is the service it provides, not the CWIS system itself, that is important. Gathering the data for your CWIS, establishing university policies that make it possible for you to have a CWIS, structuring data and menus for a CWIS, and the vast majority of all the other work you'll need to do to make it successful is valuable even if you never turn a CWIS on for a second. Is a CWIS some passing mania? I don't think so, but even if I'm wrong, getting one going will be good for your university.

Unfortunately, a CWIS is not a miracle. It will not make your managers paragons of professionalism, nor make all of your users kind and considerate. It will, however, provide your users with the information they need wherever they are. It will turn the data in your departments into a university resource. It will get computer-phobic people to use computers, and to even enjoy using them. And it will change users' perceptions of computing and information in ways that will be of great benefit to the university. A CWIS, without compromising the university's very serious mission, can make being part of a university more entertaining, enjoyable, and yes, enlightening, too. ■

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What Makes Faculty Award Winners Different?

On most campuses today, the numbers of faculty who are not computing still outnumber the ones who are. And if we count those who are *actively* computing, that is, using technology to consistently enhance their academic activities, whether it be teaching or research, we find an even smaller number. What is it that makes a faculty member interested in pursuing this still relatively rare involvement? And in some cases, not only pursue it, but be dedicated enough to the task to become wildly successful at it? We talked with some of this year's EDUCOM software award winners to find out the answers. This is what we were told.

Access to computing tools. This may seem to be an obvious need, but it is still a missing ingredient for many faculty. Even in some of the institutions that have made large resource commitments in the area of information technology, it often seems that the students and the administration are provided for first. A computing device with appropriate software on every faculty desktop is a necessity if more faculty members are to get involved in substantive ways with academic computing.

Rewards for appropriate technology involvement. It is still, by far, the norm to ignore work done in software development in the promotion and tenure processes. Even though the computing work and the software developed may contribute significantly to curriculum design, research, or improvements in classroom instruction, and even though the work itself may have been, in fact, more extensive than what the faculty member might have accomplished with a scholarly article, or even a book, it is not sufficiently acknowledged at this point to be an incentive for very many faculty. In fact, there may be a disincentive to working in software development because it takes precious and limited time away from other work that will be counted for promotion or tenure.

The work is often ignored outside of the P&T process as well, with other kinds of faculty awards and rewards based on almost anything and everything but software development or involvement in computing. In fact, some of the faculty told us that it was ironic, in a way, that EDUCOM would recognize them in this important way and applaud their achievements when no one on their own campuses really knew what they were doing.

> *Computing can be very frustrating, especially if the faculty member is breaking new ground. Just on the basic level of getting different components to work together properly, a typical faculty member is likely to run into major problems.*

Persistence. Computing can be very frustrating, especially if the faculty member is breaking new ground. Just on the basic level of getting different hardware or software components to work together properly, a typical faculty member is likely to run into major problems. One has to also be fairly immune to the potential embarrassment of running classroom software that doesn't work right the first time (or any time). Persistence in acquiring the right resources, persistence in making them work and work together, and persistence in dealing with skepticism are all necessary to be successful.

Specialized support. The support typically available from the campus computer center is too low-level or general to be of much help, at least beyond a certain point. But when the computer center, or one's own department, for that matter, can provide discipline-specific user support, then it can make a very big difference. One trend that was noted was the growing use of user assistants who are knowledgeable about the actual discipline of the faculty members in the departments which they serve. Locating that person close by, even if he or she still works for the central computer center, was also thought by all to be a very good idea.

A voice in governance. On a final note, the faculty members with whom we spoke felt that it was very important for the administration of their institutions and for the managers in the campus computer centers to acknowledge their existence and their expertise, at least in certain matters. They felt that some kind of an academic computing advisory committee was essential in promoting the right atmosphere on campus that would encourage faculty to get involved in computing in substantive ways. Without such a committee, it was felt, a signal is sent that the institution as a whole does not really value academic technology and the potential it offers to improving the educational process. ■

Exemplary Leadership and Information Technology Excellence ...

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ATM-like access for students to their own registration and financial information; and reorganized all computing and communications units into a single IT organization.

Within the IT group at BC, Bernie has developed a strong group of disciples who share his vision and enthusiasm. His willingness to allow employees to experiment and fail, to grow and demonstrate initiative, has built a highly successful and innovative organization.

To encourage innovation, risk-taking, and individual contribution, Bernie instituted a totally merit-based review and compensation system for his department—a system so successful, it was modified for use across the entire university. The structure of the IT organization, based on the provision of superior end-user support for academic and administrative users, remains flexible enough to adapt quickly to rapid changes in technology while maintaining its focus on the strategic plan.

These innovations have built an IT organization with a reputation as one of the best in higher education. In fact, accreditation reports on the university routinely praise its use of computing and communications, and BC has become a role model for institutions in their effort to use information technology more effectively.

With a focus on comprehensive solutions and the "big picture," Bernie shared his vision and experiences in *Open Access: A User Information System*, a well-received CAUSE Professional Paper. In fact, due to his comprehensive view of the institution's strengths and needs, its objectives and goals, Bernie is often sought out for his views on issues that far transcend his specific area of responsibility.

Bernie also brings first-rate administration, management, interpersonal, and communication skills to his job. Described by his staff as a very accessible and effective manager who communicates well at all levels within his organization, he is widely admired and respected for his open approach.

It is this unusual combination of leadership, vision, and technical innovation which has won Bernie Gleason the recognition of his peers with the 1992 CAUSE *ELITE* Award.

Our thanks to Julia Rudy and the CAUSE organization for the information in this article. ■

"...We are focusing on the wrong issue when we talk about technology and its role in education. It is *not* a matter of putting PowerBooks in the hands of students or filling labs with workstations. It is, rather, clearly formulating what is expected from the use of computers, planning what resources are to be provided on the networks, and, most importantly, understanding what communities the electronic systems can foster.... The computers and the networks are the minor (not to be confused with inexpensive) parts of the equation.... The challenge is to change the fabric of the educational process—to question both our mission and methods, not just layer on technology."

Pat Molholt
Columbia University
Letter to the Editor
The Chronicle of Higher Education
November 4, 1992

In Future Issues

- *Applying Total Quality Management to higher ed information technology*
- *CAUSE92: the best keeps getting better*
- *What are presidents thinking about? What are CIOs thinking about?*

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EDUTECH RESPONDS

Q. You recently had an article on vendor demos and the things to watch for. One thing you didn't mention was the order in which the vendors actually appear. Doesn't the first one have an unfair advantage?

A. *Not necessarily. For an institution that is not really aware of what is available today in modern, online, integrated administrative information systems, it may be that the first vendor to demonstrate its system has the most opportunity to impress and to educate the audience. But this is very likely offset by the last vendor being the one most remembered. And for institutions that are already well aware of what's going on in systems today and are conducting the demonstrations to be able to specifically differentiate among vendors, it probably doesn't matter which order the demos are in. It's good that you want to maintain as level a playing field as possible, but frankly, these things are hard enough to schedule without worrying about sequencing as well.*

Q. One of the issues that plagues this campus, and I'm sure many others as well, is the issue of diversity leading to incompatibility. That is, we have pretty much let everyone choose his or her own computing environment, including microcomputer hardware and software. This has resulted in a lot of freedom and individuality leading to a great deal of enthusiasm and endorsement for computing in general, all of which is good. But it has also led to an enormous support issue and increasingly difficult work as more and more people want to communicate with each other. Where is the right balance?

A. *Most institutions make this determination using the criterion of affordability. In other words, the essential question is, how much diversity can you afford? If the hardware and software configurations for every user on campus were exactly the same, the support and communication issues would be straightforward and relatively low cost. Even though few institutions could tolerate such single-mindedness, it is important to recognize that every deviation from that uniformity will have a price. The good news is that the price of diversity is dropping, as more bridges and pathways are built among various configurations.*

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THE EDUTECH REPORT

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The Education Technology Newsletter for Faculty and Administrators

IT Excellence: It's Not Instant Pudding

Icy fingers grip your heart. You've just returned from lunch and sitting on top of your stack of messages is one from the president, saying she wants to see you right away. With lightening speed, the three or four reasons she might have called you race through your mind.... She wants to congratulate you on your success in developing the new tuition billing system. She wants to talk about putting a workstation on her desk. She wants to talk about training her secretarial staff in WordPerfect.

Deep down inside, you know it's none of these things. By the time you get to her office, you've begun to hear whispered rumors in the hallways. The president's secretary greets you with sympathy in her eyes. You walk into the inner office, and there they sit: the president, the vice president for development, and one of the trustees. How could this have happened, the vice president for development says to you. How could the last set of special donor acknowledgments have gone out in the mail, over the president's signature, riddled with errors, including mistakes in the dollar amounts received and the spelling of some of the names? The donors have been calling, he says, confused and annoyed.

You try, of course, to put the best face on it with them, try to look like you knew all about this and that a fix was already in place, try very hard not to be defensive or to shift the blame onto the development staff for not checking the letters before they went out, and of course, try to assure them that this can never, ever happen again.

The bottom line is that after all of your hard work and your dedication to what you thought was right, you've just moved back about ten steps. You've lost credibility with the person with whom it counts the

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"Computing in general, and networking in particular, are about empowerment and about the redistribution of access to power through information; about the breakup of monopolies, that librarians, in particular, have held. But so have registrars and bursars and others who controlled paper-based information. Now comes the reshaping of the roles of everyone involved. Focusing on the people part of the success equation *is* a challenge, but no greater a one than we are accustomed to dealing with in harnessing the technology portion of the equation."

Pat Molholt
Columbia University
"Investments in Human Capital, or Do You Have a Maintenance Contract on Your Programmer?"
CAUSE/EFFECT
Winter 1992

NEWSBRIEFS

THE MAGIC OF TECHNOLOGY

"The Magic of Technology" is the theme for this year's National Educational Computing Conference (NECC), hosted by the University of Central Florida, to be held June 28–30, 1993 at Marriott's Orlando World Center in Florida. With 5,000 expected attendees, the conference will provide a broad forum for those interested in educational computing. NECC '93 has the following goals: to present a spectrum of major work regarding computers in instruction; to promote interaction among individuals at all levels in the various aspects of computer uses in education; to develop and coordinate interaction among the professional groups involved with computer uses in education (such as the Association for Computers in the Humanities, EDUCOM, and the Consortium for Computing in Small Colleges); and to produce a proceedings documenting the status of educational computing.

For more information, contact NECC '93, University of Oregon, 1787 Agate St., Eugene, Oregon 97403.

ANOTHER PIONEER PASSES FROM US

John Kemeny, former president of Dartmouth College and co-inventor of the BASIC language, died in late December of an apparent heart attack at the age of 66. A mathematician, Kemeny received his doctorate from Princeton University and worked on the Manhattan Project in the 1940s to develop the first atomic bomb. He went on to be a research assistant for Albert Einstein.

In addition to inventing BASIC in 1964 with fellow Dartmouth faculty member Thomas Kurtz, Kemeny was one of the first college presidents to recognize the potential that technology has for education, especially in the teaching process. In the last few years he had been working on new versions of BASIC and had been a featured speaker at many conferences and seminars on educational computing.

SOFTWARE AWARDS 1993 COMPETITION

The annual EDUCOM Software and Curriculum Innovation Awards Program was established in 1987 to recognize and promote quality educational software and computer-based teaching innovations in higher education. This year's competition will focus on the natural sciences, the social sciences, the humanities, mathematics, engineering, and law, and has two divisions: the curriculum innovation division, for the innovative uses of new or existing software to solve important instructional problems; and the product division, for original software.

Entries for the competitions are due in by February 26, 1993. Forms and additional information are available by contacting the EDUCOM Awards program at the University of Maryland, Computer Science Center, Building 224, College Park, Maryland 20742; (301) 405-7534.

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What Presidents Are Thinking About

Over the past few months, a lot of attention has been given to the role of presidents in shaping their institution's approach to information technology. Among other things, we have seen a new publication from HEIRA (Higher Education Information Resources Alliance) directed toward presidents, and at least one session at the October EDUCOM conference devoted to the concerns of institutional chief executives. But while most of us can articulate what we think presidents *should be* thinking about, it isn't always as easy to discern what they actually *are* thinking about.

So we decided to ask. In an informal survey over the past few months, we talked to more than 50 college and university presidents and asked them the question, "What do you think about information technology on your campus?" This is what we heard:

The primary role of the Information Technology department should be facilitative, not directional. Apparently, many presidents are under the impression that their campuses have been driven by technology, rather than the other way around. While acknowledging, to some extent, that this has been necessary in some cases to move forward, most of them now think that new initiatives should come from the users, not from the IT department.

We all need to provide a lot of support and encouragement to the faculty who may be having trouble seeing the benefits of technology. As one president put it, the faculty need "to have their appetites whet." But it is also necessary to demonstrate why they might need these new technology tools—gee whiz isn't good enough.

Communications skills in the person who heads up IT are every bit as important as technical skills. Presidents need to understand, and to trust, the person in charge of this important (and expensive) resource, and they are no longer willing to put up with technical prima donnas.

Most institutions need an advisory committee for, among other things, adjudicating competing demands. In the past few years especially, everything has turned into a balancing act for resources. Since all demands cannot be met, this committee needs to make sure that the things that are done are in line with the institution's priorities.

> *Even when they feel they are not being heard, IT folks should continue to be "doggedly determined;" eventually, it will penetrate even the most conservative president.*

The future is in the library. Presidents are far more convinced of the virtues of library automation than of almost any other aspect of higher education technology. Either librarians are doing a better selling job than IT directors, or the application is just more obvious to the non-technical executive.

One of the difficulties in communicating with IT people is that they try to teach you everything they know. Keeping technology simple and accessible for novices, especially presidential novices, is a challenge that has not yet been fully met by IT people. There are still a lot of presidents who feel intimidated by the whole thing.

Presidents have to learn that it is wrong to think that computing is not "professional." They have to learn that word processing is a perfectly acceptable alternative to dictating; electronic mail can work even better than having a secretary place calls; and so on.

Presidents are as concerned about computer equipment replacement as they are about the physical plant. From a financial viewpoint, this concern weighs heavily, especially with the popular press being so filled with stories of rapidly advancing technology. Most presidents see the need to establish a fund for this, while acknowledging that this would mean trading off with something else.

The centralization/decentralization issue is not really relevant. Information technology and information has to be distributed, rather than either centralized or decentralized; this is the best of both worlds. Otherwise, it is just a territorial issue. IT should encourage interaction among the users themselves rather than always trying to deliver services centrally.

IT people have to continue to be persistent. Even though their work may be discouraging at times, and even when they feel they are not being heard, IT folks should continue to be "doggedly determined;" eventually, it will penetrate even the most conservative president. ■

IT Excellence: It's Not Instant Pudding ...

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most. Try now going into that meeting next week to explain the new capital expenditures you need to hook up the remaining buildings to the campus network. Try asking now that your department be exempted from the campus-wide hiring freeze.

This mess will get cleaned up, of course, and you and your staff will survive. Until next time. The question is, does there have to be a next time? Do we have to take it for granted that there will always be a certain number of errors in the computer center? Do we have to assume that information technology is inherently troublesome?

As IT professionals, we owe it to ourselves, to our departments, and to our institutions to examine ways to ensure that the work we do consistently meets the goals that it should. There's a lot of evidence that we are perceived by our institutions as either not setting—or not meeting—appropriate goals.

And why is it so important that we do? Why has this taken on, in fact, a most critical importance in the last few years? Because our institutions are struggling. We see it every day. Enrollments are down. Tuition income is down. Donations are shrinking. We are hearing that some of our educational programs don't mesh with real world needs. That our colleges are not keeping up with the times. The public is looking very critically at institutions of higher learning. So are federal and state governments, which are themselves under pressure to assure that tax dollars are being spent wisely.

As a result, decision-makers at our institutions are looking very, very carefully at the value of information technology. Two of the most frequently asked questions on our campuses today are: "What are the benefits of information technology to this institution?" and "Have all of our expenditures (mostly large, and certainly larger than in many other areas of the institution) been worth it?"

So the question is, how do we ensure that our information technology departments are genuinely useful to our institutions? How do we avoid being an institutional drain, rather than an institutional resource? How do we make the benefits of technology so obvious and so outstanding that everyone will want to move forward, including the president?

> ***Do we have to take it for granted that there will always be a certain number of errors in the computer center? Do we have to assume that IT is inherently troublesome?***

The answer is that our information technology organizations need to reach a considerably higher peak of excellence than the one most of them are on at the moment. And one of the ways that can happen is with a concept and a set of tools called Total Quality Management (TQM). TQM has the potential to move us in a positive direction toward excellence.

Total Quality Management

TQM is a system that has worked well for several decades in other parts of the world, and has become very popular in our country in the last few years. While it is true the focus up to this point has been in the business and industrial sectors, higher education itself is beginning to embrace TQM as well.

Total Quality Management, known to some people as the Deming Management Method, was developed by several people, most notably W. Edwards Deming. Deming gained fame in the 1950's by enabling Japanese industrial systems to achieve their reputation for quality.

Deming's theory has been reworked and expanded upon by a number of people, and has been synthesized any number of times into some number of components. Basically though, it comes down to three critical issues.

Issue #1:
Focus on the Customer

The first is that whatever you do, what ever business you are in, your work must be driven by, and focused toward, *the customer.* You have to know who your customer is, and even in a college or university setting, where you might think that the answer to this obvious, knowing who your customer is isn't always easy to do. You have to know what your customer wants; you have to know what your customer needs; you have to know what your customer values. Most of all, you have to know what your customer thinks quality is.

Who are IT's customers? On one hand the answer is obvious: IT's users, or customers, are students, administrators, and faculty. But that's only if you cut it one way, and describe the user base along functional lines. It could also be put this way: our customers are mainframe users, minicomputers users, and microcomputer users. Or you could say the user base is made up of three groups: potential users, infrequent or undemanding users, and very frequent or demanding users. Or you could say the customers are in two groups: happy and unhappy.

It matters very much who your customers are, because it has implications for how you organize your services, and what services you provide. For instance, one of the classic organizational issues is whether there should be combined or separate computing centers for faculty and administration. Well, if an administrator who is using a Macintosh for analyzing downloaded data from a large IBM mainframe has to go to the academic computer center for assistance with a Macintosh problem because that's the only place on campus that anyone knows about Macintoshes, there is reason to question whether the division between academic and administrative makes sense anymore.

The next question we have to ask is whether it is the users, or something else, that really drives our work. Do we have the idea that we have to lead the users in order to make progress, or do we let the users always take the initiative?

And that leads us into the area of performance judgements. Do we use the customer's criteria to judge our performance, or do we use our own? Often, we're measuring CPU cycles and network bandwidth but the users are measuring how many attempts it took to get a file transferred from Mac WordPerfect to DOS WordPerfect. We have to learn that excellence in information technology comes from one thing only: *customer satisfaction*; not from the number of MIPS in the computer center, not from the speed of the campus network, and not from the number of lines per day the programmers code.

Issue #2:
The Process

The second critical issue surrounds *process*. TQM is based on the principal that process, or the flow of work activities, is the critical factor in attaining quality. Even more importantly, the process needs to be guided by a truly customer-oriented focus. In serving the customer efficiently and effectively, we need to capitalize on the two main process components of design and output.

> *If a program fails to meet the primary goal of serving the user, according to the user's definition, then it doesn't matter how elegantly crafted it is, it has failed.*

Both design and output must work together in harmony. For instance, if an elegantly crafted program that produces student bills doesn't include housing charges or financial aid awards, it might not be what the user wants. And if it fails to meet the primary goal of serving the customer, then it doesn't matter how elegant it is, it has failed.

Issue #3:
Staff Involvement

The third critical issue in TQM is staff involvement. A recent article in this publication talked about a fire in the computer center at Fordham University. One of the authors, Walter Weir, Fordham's executive director of computer and information management systems, made this point: "When the fire occurred and we had to send our network people in to repair the damage, no one had to stand over them and say, 'You do this and you do that.' Each one knew exactly what needed to be done and got on with doing it. They had the right tools and they had the authority; as a result, they were able to save us from what could have been a major catastrophe for this university. In fact, they were able to resolve it in such a fast and expeditious fashion that many people were totally amazed."

Why did this happen? Because months before, they had instituted TQM in their department, and by the time of the fire, had already been actively engaged in the two major components of staff involvement: team building and individual empowerment **[see article on page 6]**. The results really paid off in a tangible way for them.

It's Not Instant Pudding

So that's all there is to it. Customer focus, process improvement, and staff involvement. Of course, it's not that easy. In a recent *Computerworld* article, Joshua Hammond, president of the American Quality Foundation, made a crucial point about quality: "The problem is that many companies are chasing this goal without a clear sense of where they are trying to go or how difficult a journey they should expect." In other words, as Deming himself said, it's not instant pudding. You can't just simply mix all the ingredients together and hope for the best. It takes real work.

What's the next step? If you think TQM might be important, you may want to take some time to learn

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Building an Excellent IT Staff

One of the cornerstones of the Total Quality Management movement is staff involvement. One of the myths about quality is that in order to achieve a higher level of quality, we need more, and perhaps better, people than we have at the moment. In contrast, one of the principles of TQM is that quality can be achieved with the people we have right now, through better training and development.

Two key components work together in building an excellent IT staff: individual empowerment in concert with team building.

Empowerment

Empowerment means giving staff members the opportunity to influence what's going on around them. Instead of simply doing work that they are assigned by a higher-level person, staff members help shape the very goals and objectives of the IT department itself.

After all, with the emphasis now on customers, who they are and what they need from IT, who better to guide that direction than the people who have been working most closely with the customers all along? Who is likely to know better the needs of the Registrar than the programmer/analyst who has been working on the student information system for the last two years? Who is likely to know better what the students who use the computing labs need than the student lab assistants?

Organizational models are changing. The staff in information technology needs to take on a new and crucially important role. They are there not simply to take orders from above or to be informed of the latest round of decisions made by others. Rather, they are there to be aggressive in contributing to problem solving, to taking new initiatives, and to being much more self-directed than has ever been the case before in our traditional hierarchical organizations.

Team Building

But with less management control comes an equally important steadying device, to make sure that individual empowerment does not go off in different directions. That device is working in teams, another of the cornerstones of the TQM philosophy. Now, many might say that at least *that* tradition is already well-entrenched in higher education—everything is already done by committee. But this is different. TQM teams are not committees in the sense that we know them. They are self-directed work groups.

> *With this new-found emphasis on customers, identifying who they are and what they need from IT, who better to guide that direction than the people who have been working most closely with the customers all along?*

In addition, they are not necessarily made up of people "representing" different constituencies around the campus the way most committees are. Rather, they are made up of task-oriented people involved with a particular process and who want to get a particular problem or issue solved.

And, perhaps most important, the teams do not go on forever. They are formed to tackle a specific quality issue, and when they have done that successfully, they disband. It is this kind of collaboration that gets things done.

The Other Crucial Item

There are great benefits to be derived from substantive staff involvement. But we have to remember that none of this will happen without the one crucial item that we have traditionally given short shrift to in the past: *training*.

It seems that whenever IT budgets get tight, or whenever something has to be curtailed for whatever reason, it turns out to be training. That sort of thing isn't going to work anymore, and we have to see training take on a new, much higher priority in our striving for excellence.

The new world of computing demands that computer professionals be not only technically talented and up-to-date, but that they also be responsive, cooperative, user-oriented, and able to see beyond just their own concerns. Attitudes such as—software is hard to write, therefore it should be hard to use; or, time spent in non-programming activities like documentation, meetings, and listening to the users is time wasted; or, the more elegant and sophisticated a program is, the better—have to be done away with, and the staff who still hold these attitudes have to be retrained.

If their departments, their institutions, and the staff members themselves can make this commitment, a major step toward excellence will have been achieved. ■

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more about it. Needless to say, there is a lot more to TQM than just these three basic components of customer focus, process improvement, and staff involvement. There is a whole range of tools and techniques, including statistical analysis methods, Pareto diagrams, affinity charts, benchmarking, and on and on, all of which will be helpful in terms of actually implementing TQM.

There are three books focusing on TQM in higher education that are quite good: *On Q: Causing Quality in Higher Education*, by Daniel Seymour, published by Macmillan; the second is from the College and University Personnel Association (CUPA) called *Applying the Deming Method to Higher Education*; the third is published by Jossey-Bass through the Association for Institutional Research, called *Total Quality Management in Higher Education*. Each of these books is also filled with references to other publications that will lead even further into it.

There is no doubt that IT people have the toughest jobs on campus. As a recent Federal Express ad put it, "It's your job not to screw this up or make any mistakes or drop the ball or blow the game. Do it faster and quicker and more reliably and more efficiently. Do it right, first-rate, top-notch, without a hitch, and absolutely flawlessly. Botch this one and you are out of here, history, finished, terminated, toast, lunch, gonzo, dead, kaput. And one more thing, DO IT FOR LESS MONEY than you've ever done it before!"

It's a big, tough job. TQM will not, contrary to what some quality experts may breathlessly assure you, change everything overnight. But its guiding principles will allow us all to make some important improvements and to take some important steps toward achieving excellence. TQM is just one set of tools you can employ to help you do that. It is a current set, it is based on some good principles, and it is building up a decent track record in other enterprises. But it is only a tool, a technique, not an end unto itself. Results are what count. The person quoted earlier, Joshua Hammond, also said, "Excellence is not a program; it's an attitude."

We have to do this. Our institutions are in trouble, and they can't afford the information technology area (and the support and services it provides) to be one iota less than excellent. Today, they need our total commitment to assuring that the technology and the technology services provided by IT meet the goals of the institution. The achievement of excellence in information technology is an issue that directly impacts the role our colleges and universities will play throughout the next century. In some cases, it may even be an issue of survival.

We have the wherewithal and the drive to make excellence happen. Total Quality Management provides another powerful tool to employ in that endeavor. ■

"Perhaps the most serious long-term challenge to the traditional textbook is posed by the rise of new technologies. The computer, coupled with an ever-expanding array of interactive, multimedia information-delivery systems, such as the videodisk, points to a future in which course materials may be altogether paperless, involving video, graphic, audio,and computer simulations to a degree that would have seemed like science fiction when most of the current faculty were themselves college students."

James Lichtenberg
"The New Paradox of the College Textbook"
Change
September/October 1992

In Future Issues

- *What CIOs are thinking about these days: major IT issues identified at CAUSE92*
- *Is pen computing the absolutely perfect application for higher ed?*
- *Students as the real end users of admin systems*

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EDUTECH RESPONDS

Q. Although we are a small college, we have many of the same problems that distress our larger counterparts. For instance, we have separate departments for academic computing, administrative computing, audio/visual, telephones, and the library, creating a great deal of overlap, inefficiency, and lack of coordinated planning. I know the current thinking in higher education is to combine all of these into a single department, and have the person who heads it all up report to the president, but that just doesn't seem right for us. Are there other alternatives that will address these problems besides a major reorganization?

A. *"Current thinking" isn't quite as consistent on this issue as you suggest; institutions are employing a rather wide variety of solutions to the problems you are facing. Especially in the case of smaller schools, simply combining administrative and academic computing can be a big step forward, and one which can be most easily justified simply on the basis of customer service. The key issues are common vision and coordinated planning, both of which can be achieved in a small college without combining everything into one department (especially the library); nor is it necessary that the person in charge report directly to the president, especially in an institution where this would be inconsistent with the overall view of the strategic importance of technology. Establishing a high-level information technology advisory committee for coordination and planning, and combining administrative and academic computing could achieve everything you need at this point.*

Q. As far as I know, my campus does not have a connection to either BITNET or the Internet, both of which I consider to be very important for the faculty. I have been trying to get the computer center to do this, but they keep telling me it's too expensive. Is there any other way to make this happen?

A. *If you have access to a microcomputer with a modem, you can reach the Internet through at least two of the commercial communications services available today: Compuserve and MCI Mail (Prodigy will soon have a gateway as well). Although this does not give you access to all features and services, it does enable very inexpensive e-mail with anyone on the Internet.*

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THE EDUTECH REPORT

The Education Technology Newsletter for Faculty and Administrators

Quality Distributed Data Management

by Lore Balkan and Gerry McLaughlin, Virginia Tech and Rich Howard, University of Arizona

There is a critically important human role in developing quality information and the data processes of our institutions. An appropriate data environment, whether based on operational, centralized, or distributed functions, should acknowledge that it is people, rather than technology, that truly determines the quality of information support. Distributed data management must become as obvious a concept as is distributed data use. Data users intuitively know this, but typically do not know how to execute good data management.

Positioning for Constant Change

As competition for resources and students becomes more intense in a tight economy, greater efficiency and better service are important goals for every institution. Many colleges have embarked on business process redesign in order to realize the greatest net gain. In turn, our information systems must adjust and attempt to deliver consolidated information from disparate, stand-alone applications not previously integrated. As managers must respond quickly to change, they require data that can provide relevant current and longitudinal information from both internal and external sources. Accurate assessment of a situation is necessary to justify and formulate plans for change. Trend data is critical for planning and goal setting. Self-assessment data is necessary for measuring productivity gains. In addition to supporting analysis that blends data from the past and the present and anticipates the future, the data architecture must allow expansion and addition of functions over time. It must also be an architecture that can be readily transported to a variety of platforms and take advantage of increasingly more effective technology as it becomes available. Institutions with a data architecture that is flexible and responsive to innovation are

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"Anyone aware that PC also stands for personal computer has probably heard of Internet, the computer-based communications network destined by next week, the week after, or next term, at the latest, to revolutionize scholarship by shrinking the international academic community to the size of a cozy faculty lounge.... Internet hums with chaotic activity, most of it unmoderated, as its users would say. The result is a sort of Towel of Babel in an echo chamber, a network vast and complex enough to induce Pynchonesque paranoia in the most levelheaded observer."

Adam Begley
Lingua Franca
January/February 1993

NEWS BRIEFS

ADAPTIVE COMPUTING KIT AVAILABLE

EDUCOM's Educational Uses of Information Technology (EUIT) Program is offering the *Adaptive Computing Evaluation Kit for Colleges and Universities* to help meet campus needs and the spirit of the Americans with Disabilities Act (ADA). The kit is designed to help schools complete the computing component of the ADA-required self-evaluation of colleges and universities, and contains an overview of the legal issues, a background checklist, a user needs survey, and a short evaluation form.

The kit is being offered as shareware, both electronically and on paper. With the payment of a license fee ($150 for campuses with fewer than 5,000 FTE students and $250 for campuses with more than 5,000; EDUCOM members receive a 10% discount), required if any part of the document is used to benefit the campus, the institution will receive a half-hour of phone consultation. For more information, contact Carmela Castorina at (310) 640-3193.

COMPUTERS IN LIBRARIES CONFERENCE

The eighth annual Computers in Libraries Conference is scheduled for March 1–3 at the Sheraton Washington Hotel in Washington, D.C. Session topics include document delivery, computer-based information networks, the Copyright Clearance Center, the workstation of the future, the evolving virtual library, and making the library ready for adaptive technology. There are also pre- and post-conference sessions, including ones on multimedia computing, and basics of the Internet.

The conference fee is $250, with a number of discounts possible. For more information, contact Meckler Conference Management, 11 Ferry Lane West, Westport, Connecticut 06880; (800) 635-5537.

NEW CONSORTIUM ESTABLISHED FOR ADMINISTRATIVE COMPUTING

A new consortium has been formed by Cornell University and Pennsylvania State University to help colleges and universities save money on administrative computing. The consortium, known as "EXEMPLAR," will promote the sharing of administrative applications for admissions, student records, registration, the financial area, payroll, and so on, among institutions that now use the *ADABAS* database management system and the *Natural* applications programming language. Other systems are expected to be included in the future, according to the consortium's founders, David Koehler at Cornell and Kenneth Blythe at Penn State.

Institutions will pay a fee of between $500 and $1000 to join. For more information, contact David Koehler, Director of the Information Resources Division of Cornell Information Technologies, 400 CCC, Cornell University, Ithaca, New York 14853; (607) 255-7252.

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What CIOs Are Thinking About

At the 1992 CAUSE Conference two months ago in Dallas, a group of college and university Chief Information Officers met to discuss major issues of concern. One of the first issues brought up for discussion was whether the CIO position, regardless of its actual title or position within the organizational structure, is a viable and long-lasting position for higher education. Given the nature of the subsequent discussion, and the topics of concern brought up by the group, it was more or less concluded that CIOs were needed for this very thing if nothing else: to be concerned about these vitally important issues.

Looking upward: The CIO has a major role to play in helping to educate his or her colleagues, particularly in the upper parts of the administration, on what technology is all about and how it contributes to the missions of our institutions. The need for other institutional officers to become educated in this area is growing rapidly, and the CIO can be a primary source for this education.

Changing management models: The management of significant segments of information technology is rapidly moving away from a central focus; if this is not done properly, we risk an under-optimized computing environment, which no one can afford. This area bears close attention by the CIO as the push toward local control continues unabated.

Information as an institutional resource: We aren't there yet and we need to be. Institutional policies and procedures are not fully in place across the board that treat information as the valuable commodity that it is, and that allow for both wide access and appropriate confidentiality and security. The CIO has the right global perspective to make this happen.

Linkages: Related to the above issue, there needs to be more of a link between information technology, institutional research, and data administration. Often, these functions are entirely separate and not working for the same goals.

Benchmarking: CIOs could be doing a better job with identifying key success indices and measuring their information technology areas against them. CIOs could also be identifying, using, and emulating successful models of higher education information technology usage more than they do.

> *The management of significant segments of information technology is rapidly moving away from a central focus; if this is not done properly, we risk an under-optimized computing environment, which no one can afford.*

Strategic planning: Information technology needs a strategic plan and the plan needs to be aligned with institutional priorities. Although this has been talked about for years, many institutions are still struggling in this area.

Reengineering: The information technology group should be facilitating and providing support for the institution to reengineer its functions. There was also a considerable amount of discussion about whether the CIO should be providing leadership and direction in this area, or just acting as an enabler for the institution's own efforts.

Influence and power: CIOs sometimes have both, sometimes neither, but most often, either one or the other. One person brought up the notion of collecting "chips" for doing the right things in the user community, and then being able to cash them in for important new initiatives.

Seeding: Related to the above, an important purpose can be served by CIOs on their campuses by seeding new ideas in the right places, and then helping to cultivate them. Often it is only the CIO who has the right organizational position and enough resources to be able to do this. The need to be a cheerleader was mentioned as well.

Creating community: CIOs often have the chance to help create a sense of community through things such as enabling electronic mail, supporting integrated systems, and so on. These activities should be considered as just as important as the technical work that CIOs do.

Preparing a new generation of CIOs: A new group of people needs to be developed and nurtured, specifically by current CIOs. It is not at all clear where replacements will be coming from.

The CIO constituent group meets on a more or less regular basis. For more information, contact Kenneth Pollock, Vice President of IRM, Wright State University, Dayton, Ohio 45435; (513) 873-3345. ■

Quality Distributed Data Management ...

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positioned to take full advantage of opportunities to improve efficiency; they will earn the confidence and support necessary to survive and prosper. Simply put, an institution that is not expandable and adaptable is likely to be expendable, and an institution's data architecture is key to its expandability.

A Customer-Driven Data Architecture

In every situation where a decision is made, information is provided to support that decision. There are suppliers of the information; there are producers who handle, analyze, and transform data to information; and there are customers who use this information. The producers, or information workers, must refine the data and add value or they will be bypassed. If users choose to go directly to suppliers of raw data and attempt to integrate it into information on an *ad hoc* basis, the results will be inconsistent at best and more likely, inaccurate.

Often the customer who receives quality information will, in turn, pass it on in some form to another information customer, thus becoming a supplier. Several customers may use the same supplier for similar information while other customers use different suppliers. The likelihood of successful interaction among these customers may well be determined by the compatibility of the information they each receive and use. When the receipt and use of poor quality data negatively impacts the efficiency and service of a function, steps must be taken to address the problem. These steps always influence and change the enterprise's data architecture, and include masking, coping, and correcting, with the latter being the most effective.

Today's managers understand the challenges of an evolving data architecture, perhaps better than the traditional computer systems professional. Not only have the managers endured the unpleasant experience of receiving multiple and incompatible answers from their major information systems, they have also created their own nightmares. In their local computing environments, they may have failed to maintain sufficiently granular data in terms of frequency of capture or level of summarization. Though few would admit it, most have also found it difficult to use data they have captured because of inadequate documentation. Additionally, these managers have struggled with data discrepancies for years while the institution's programmers cranked out code to process whatever data existed and considered their job successful if the program ran without generating error messages.

> *An institution that is not expandable and adaptable is likely to be expendable, and an institution's data architecture is key to its expandability.*

Data Management in an Architected Environment

Architectures are evolving to a combination of decentralized, centralized, and distributed information support environments. In the decentralized environment, a spider-web of systems evolves where data is passed from operational source systems to a variety of users who then develop their own systems and may become suppliers to subsequent customers. Often these operational systems are capable of producing reliable information through their own documentation and definitions. However, they are not an organizational resource because their components are not integrated or standardized.

With a centralized system, there are standards in place for data handling and coding and the provision of information. This centralized function ensures the internal validity of the data.

With the mature data architecture, distributed data management, information is distributed to users with enterprise-wide content and form to support tactical decision making in a strategic and coherent fashion. In this environment, the data flows from the operational source systems through a central store, the administrative university data base, where it is restructured. Information then flows out to users from the data base. This central store contains the critical enterprise data in a standardized form. This means that the source systems must likewise maintain and process standardized data and migrate data to the central store by a flow through a rigid translation process, possible only if there is organizational accountability for data quality standards.

Nurturing A Commitment to Data Management

With a data architecture blueprint for quality information support and an organizational map that identifies the data management roles at every level of the architecture, it

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A version of this article was originally given as a talk at the 1992 CAUSE Conference. The authors are frequent contributors to CAUSE/EFFECT Magazine.

becomes clearer where and how to work the organization to increase awareness and involvement in distributed data management.

The nurturing process must begin with consensus-building activities to identify the information support requirements. As with any service, it is always easier to understand when the service is poor than when it is good. It is not surprising, and should not be viewed as a negative, that the starting point for improving quality is to create focus on the problems. Many projects and many problems have convinced us that the key issues are not technology issues or resource issues; they are people issues.

Three Tiers of Data Management

The process of creating quality information starts with the supplier in the decentralized operational office. Here there are two sets of responsibilities: a data custodian and a data steward. The data custodian is responsible for providing relevant administrative data to the organization in a reliable form and in a manner consistent with established standards. The custodian is also accountable for the proper care of the data in the operational system and is directly involved in policy matters. A data steward is responsible for the maintenance and dissemination of data under the direction of a data custodian, and executes procedures which insure the capture, storage, validation, correction, modification, security, documentation, and delivery of data from the operational area.

At the central level, there is a function which concerns itself with enterprise-wide administration of the information resource, including activities such as the development and implementation of standards for compatibility, accessibility, and interfaces. It exists to provide information to users from a variety of decentralized operational systems and to further insure that the user who obtains data is also given an understanding of what the data elements are and how they were collected.

Beyond assimilating and integrating data from decentralized operational systems, this central function is also the logical place for information workers to perform analysis, summarization, and archival of data critical for an institution's decision making. This process of producing information is basically one of pre-processing data and transforming it into information. Performing such transformation of data and producing information will invariably require these information workers to also function as a mediator between the data supplier and the user.

> *Many projects and many problems have convinced us that the key issues are not technology or resource issues; they are people issues.*

If information is to be provided to various users in a full distributed model, then the central function must take on yet another role. It must be involved in selecting and optimizing technological tools that increase the portability and accessibility of data. As a follow-on, this central function must market the products made available and train on their use. The result is that the users will do increasingly more data analysis and interpretation. To this end, the central function must provide the required coordination and education and an increased awareness of users' information needs.

The final tier is that of distributed data management. It is important to realize that very few of those users who receive data and support from the central function are truly end-users because they too have customers. Most of them take the data and further distill and combine it through their own analysis and manipulation procedures. As such, they perform multiple roles of user of centrally supplied information and producer of additional data with value added. They may also become suppliers of new operational data to the central function. Their most critical need is to understand the generalizations of the data—not only how the facts can be interpreted, but also for what purposes.

Groups That Support Data Management

The individuals in the three-tiered data management scheme are the foundation for the compliment of groups needed to achieve the correct balance of change across the organization. Note that the groups will include users and not just suppliers and producers. There will also be instances where one person is a member of multiple groups. There are at least seven generic groups that must be engaged in a program to change and improve data quality and likewise, to sustain distributed data management:

Management Group: The executive administrators who must be advised of progress and major steps

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The Institute For Academic Technology

by Liz McRoberts

You are in the delivery room and a newborn baby under your care is having trouble breathing. You must make a quick and accurate decision about what to do if you are to save its life, and you choose wisely. Congratulations are in order. The child, however, was in no real danger, regardless of your decision. You were only studying with an interactive computer program.

For decades, textbooks, laboratory exercises, and lectures have typified, and sometimes limited, traditional instruction in higher education. Putting theory into practice often had to be done under close supervision of the instructor, or on a trial-and-error basis once the student was out of school and on the job. Now, through the use of imaginative, interactive computer technology, students can face real-life situations, put their skills to the test and never leave the classroom. It is this technology that the Institute for Academic Technology (IAT) at the University of North Carolina at Chapel Hill is helping faculty members to understand, use, and create.

The uses and usefulness of the new technology in education are almost limitless. Other examples of this innovative technology include an interactive periodic table program for undergraduate chemistry students. Using this program, students can choose elements from a standard periodic table displayed on their computer screens, read about that element's specific properties, see a three-dimensional picture of its structure, and even perform "dangerous" experiments without the worry normally associated with such practices in the wet laboratory.

Another program allows foreign language students to navigate through a typical French marketplace via video displayed on the computer screen, and to listen in on group conversations. It also lets the student watch and listen to interviews with market shoppers in which the student learns to better recognize the language by paying closer attention to the speaker's facial expressions. The program enriches students' learning processes by truly immersing them in the French culture. The IAT provides assistance and encouragement for any and all faculty members who wish to take advantage of such innovative teaching tools.

> *This year, 3,000 academics from community colleges, four-year schools, and research universities will attend IAT seminars and workshops to learn more about academic technology.*

The IAT, operated by the University of North Carolina at Chapel Hill and funded by a grant from IBM, was established in 1989 as a partnership between business and education. The IAT acts as a liaison between faculty members who have teaching needs and IBM, which is developing the technology to meet those needs. This year, 3,000 academics from community colleges, four-year schools, and research universities will attend IAT seminars and workshops to learn more about academic technology and to provide feedback for IBM on academic products.

"The IAT was set up to enable the worlds of business and academia to communicate more effectively and to carry information back and forth," says Dr. William H. Graves, the IAT's director and UNC's associate provost for information technology. "We work to bridge the gap between higher education and the computer industry by bringing technology into the classroom and by helping IBM understand the products we academic users need. This way, we give teachers ways to improve the quality of education, and we give IBM ways to improve the quality of its products."

The IAT has an electronic classroom, as well as an auditorium, in which its faculty members and staff conduct seminars, workshops, and individualized planning sessions for educators nationwide. These sessions are designed to spark the interest of academics, to keep them informed about what the available technologies can do, and to help explore ways they can use technology on their own campuses.

For more information about seminars, workshops, national satellite broadcasts, or technical publications, contact the IAT at UNC at Chapel Hill, P.O. Box 12017, Research Triangle Park, NC 27709; (919) 560-5031. ■

Liz McRoberts is the Communications Manager at the Institute for Academic Technology at the University of North Carolina at Chapel Hill.

Quality Distributed Data Management ...

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undertaken to improve information quality. They should not be expected to be wildly excited about the data management process. However, they will be very concerned about data consistency and accuracy and excited about using the same data as everyone else.

Custodial Group: The senior managers who need to be brought together to discuss policies, to do strategic management of the data resource, and to discuss issues with the management group.

Stewardship Group: The supervisors and system support analysts for the operational source systems, with a set of responsibilities that are likely embodied in numerous job descriptions. They translate policy into practice and should be encouraged to consider procedures which produce standardized data.

Data Management Group: This group provides the stimulus for identifying the need for change. It coordinates the interfaces between the operational level and the users, thereby establishing position to recommend standards. It also collaborates with the computer technologists on implementing the tools needed for data management.

Focus Group: A vertical slice of the custodian, steward, operational personnel, users, and other interested individuals who work with data from a major operational source system. This group starts the development of standards for the data in an area and then maintains an activity with audits for sufficiency and relevance. Subgroups are sometimes formed to address specific problem areas.

Administrative Systems Users Group: This is an open group of users, stewards, systems analysts, and operational personnel from across the enterprise. It meets on topics such as new processes, changes in technology, developments in systems, and the like. Smaller task-groups are formed from the larger diverse group to work on developing the standards that must cut across the entire organization.

Systems Group: The workgroup or project team that defines, develops, and deploys the underlying systems and networking infrastructure. A subset of this group is usually assigned to support each of the major operational systems.

To instill good data management values at all levels of the data architecture, it is necessary to use all of these teams to create linkages between organizational perspectives. This is best accomplished by applying the skills of many individuals to problems.

A Look Ahead

People and their relationships in the organization must change as many of our processes are re-engineered to take advantage of new technology and quality management concepts. We must recognize and seize opportunities to focus on improving data management as part of this evolution. ■

"Users of the Rossetti Archive (a hypermedia body of graphics and text related to the paintings and poems of 19th-century artist Rossetti), which is envisioned by its creator as a 15-year project, will be able to select and display for comparison any combination of color images of paintings and bit-mapped images of original handwritten pages or transcriptions.... The ability to quickly find and compare elements in Rossetti's works will enable insights that would be difficult or impractical to achieve by more conventional means."

Gary H. Anthes
"Technohumanities 101"
Computerworld
February 1, 1993

In Future Issues

- *Outsourcing revisited: it doesn't have to be all or nothing*
- *Is pen computing the absolutely perfect application for higher ed?*
- *Students as the real end users of admin systems*

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EDUTECH RESPONDS

Q. We have just one person in our computer center, and he is planning to retire shortly. Most of his work consists of keeping our information system, which we purchased about five years ago, up and running and making modifications as needed. Does it make sense to think about just getting maintenance services from the systems vendor, rather than trying to replace this individual? We are a very small college, and I'm not sure we really need to have our own computer person.

A. *It depends on several things. First, a comparative cost analysis will help you determine which option is likely to involve the least amount of short-term expenditure, probably a major factor in your thinking. In this analysis, be sure to include employee benefits and other overhead items associated with in-house operations. But there are other factors which should also enter into your thinking. For instance, how many years will you have to commit to using the systems vendor? How much is the vendor support cost likely to increase over time? Will it be a relatively easy process to return to in-house support if you should decide to do so in the future? Will you actually be getting the same kind of support that you have been with an in-house employee? Will you have a say in choosing the individual who provides the vendor support? How will you control quality? What if you decide to change software systems in the future? The answers to these questions should be carefully considered in your decision.*

Q. We are beginning to use local area networks in several departments across campus. My question has to do with the software. Is there a restriction on putting up a single copy of software on a network and letting everyone on the network use it?

A. *Probably yes, but it depends on the specific software you have in mind. When you acquired the software originally, there was a statement under the shrink-wrap which you agreed to adhere to by opening the wrap. That statement detailed the restrictions under which you can use the software, including network use, use by a single individual on multiple computers, and so on. If you no longer have that material, it's best to get in touch with the vendor before assuming anything one way or the other.*

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Choosing A New System: Two Schools Do It Right

As anyone who has been through it can tell you, choosing a new administrative information system is not an easy task. It takes a lot of work, a great deal of commitment, and an unrelenting desire to reach the goal despite roadblocks and sidetracks along the way. One thing that helps is having a well-defined process to follow that keeps everyone, including the vendors, on track.

Two institutions, entirely different in mission, size, scope, and campus culture, recently successfully completed their searches for a new administrative system, and both schools, although having chosen two quite different solutions, followed exactly the same process to achieve their goals.

Webster University is an independent, nondenominational institution with approximately 10,000 students pursuing undergraduate and graduate programs in the Liberal Arts, Performing Arts, Business and Management, and Education. Located in Webster Groves, a major suburban center of the St. Louis metropolitan area, the University operates three other locations in metropolitan St. Louis; four campuses in Europe (Switzerland, the Netherlands, England, and Austria); thirty-five military bases in sixteen states, Bermuda, the District of Columbia, and Iceland; and centers in eleven other U.S. cities. Student enrollment at Webster University has increased 28% in the past five years. While founded in 1915 as a Catholic women's college, Webster became an independent coeducational institution in 1967.

Wabash College is an independent, undergraduate, residential liberal arts college located in Crawfordsville, Indiana, approximately 45 miles northwest of Indianapolis. Established in 1832 to serve the needs of a frontier pushing westward, Wabash has long trained preachers and

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"Banning recreation on computer networks is not a good idea....As is increasingly necessary in our society, institutions need to establish common-sense codes of behavior concerning the use of computers, but they should not attempt to solve the problem with a sledgehammer. Instead, personal responsibility should be stressed and responsible behavior encouraged through education and sensible guidelines."

Edward J. Carmien
University of Findlay
Letter to the Editor
Chronicle of Higher Education
December 16, 1992

NEWSBRIEFS

USING TECHNOLOGY TO DO THINGS DIFFERENTLY

An invitation to participate in this year's annual conference has been issued by the League For Innovation in the Community College. "Reinventing the Community College: Using Information Technology ... To Do Things Differently ... To Do Different Things" is the theme of the conference, to be held November 14–17, 1993 in Nashville, Tennessee. Presentations are being sought in areas such as multimedia in instruction and student services; distance learning; networks; services for students with disabilities; models for planning, supporting, and managing technology implementation; and partnerships for technology implementation.

For proposal forms and more information, contact the League for Innovation, 26522 La Alameda, Suite 370, Mission Viejo, California 92691; (714) 367-2884.

TELECOMM IN EDUCATION

Since the First International Symposium on Telecommunications in Education was held in Israel in 1989, the use of telecommunications in education has grown rapidly around the globe. Today, thousands of telecommunications networks and projects enable many students and teachers to engage in collaborative educational projects. Advances in technology, increased pressures to improve education, changes in world political landscapes, and the resulting policy issues create a challenging backdrop for the Second International Symposium on Telecommunications in Education, Tel-Ed '93, to be held at the InfoMart in Dallas, Texas, November 10–13, 1993.

The symposium, *Global Connections*, will give leaders in educational telecommunications a forum in which to learn about rapidly-advancing developments in telecommunications technologies; to debate key policy issues; and to share experiences, ideas, insights, and research findings on the applications of this new technology to education. The conference (which should attract about 1,000 educators, policy makers, and researchers) is designed to let participants see demonstrations of successful educational telecommunications and distance learning projects, as well as discuss emerging technology trends.

For more information, contact the International Society for Technology in Education; 1787 Agate Street; Eugene, Oregon 97403; (503) 346-4414.

EVERYTHING IS RELATIVE

Following in the footsteps of most other major libraries, the Harvard University Library is finally bringing automation to its card catalog. But it isn't easy. According to the Associated Press, the project has been made even more difficult by hand-written index cards that were cataloged by now-obsolete rules. Some are in Cyrillic, Arabic, Hebrew, Chinese, Japanese, and other writing styles. The Harvard library system includes 12.2 million volumes.

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A Objective Look at Outsourcing

Book Review

Managing the Economics of Owning, Leasing and Contracting Out Information Services

Anne Woodsworth and
James F. Williams II

For many information technology professionals, outsourcing tends to be an emotional subject. One still hears tales of ruthless takeovers of college and university computer centers by profit-making companies, ousting dedicated employees with years of service and then driving up long-term technology costs for their vulnerable and helpless contract-bound institutions. Even beyond the emotional arguments, some have reasonably questioned whether such a critical and strategic institutional service as information technology should be in the hands of outsiders.

On the other hand, because of the economic conditions pervasive throughout higher education, many information technology managers (and the administrators to whom they report) have been forced to consider at least some outsourcing in recent years, if only to be in a position to assure their institutions that every single technology dollar is being spent wisely. Although this book is focused on libraries and information centers, it will nonetheless turn out to be a very important resource in assessing outsourcing possibilities and options for computing centers in an objective, non-threatening, and non-emotional way.

Managing the Economics of Owning, Leasing and Contracting Out Information Services identifies and describes the most important factors that must be considered in making decisions about the optimal ways to provide access to information. It also answers some critical questions, such as: How should organizations define their “core” information services? How can the costs of providing services be controlled? Is there any important value added when an “outsider” provides a service? Is it feasible and realistic to contract out whole operations?

Why do decision-makers, especially, need this book? Because, as the authors put it, “Computing, information systems, and libraries are mysterious and marginal operations to most executives. Mysterious in the sense that the fields mask their functions in jargon understood only by the initiated—the information scientists, chief information officers, librarians, or information resources managers; and marginal because libraries and information systems are part of operating overhead and not easily linked directly to profit-margins or organizational missions.” A decision-maker needs a way to make this link, and to assess whether outsourcing some or all of these operations makes sense.

The first two chapters examine and then explain how information services and systems function within an organization, and how this kind of work can be handled in-house or contracted out. The following two chapters describe the complexities of the information world—that is to say, the information resources and the technologies themselves. Realistic expert advice, especially for non-technical decision-makers, is provided in each of these chapters covering issues such as doing a cost-benefit analysis, the pros and cons of outsourcing, and ownership versus pay-as-you-go procurement.

With collaborative ventures providing more opportunities for the possibility of sharing of systems, services, and resources, a chapter is devoted to the issues, problems, and benefits of cooperative use of information systems and services. Other chapters include a look at the fiscal issues, including costing, pricing, and internal charge-backs; and a very interesting review and discussion of future possibilities (or, “how to effect change in a no-change culture”).

Anne Woodsworth is the Dean of the Palmer School of Library and Information Science at Long Island University. James Williams is Dean of Libraries at the University of Colorado, Boulder. Many may remember Dr. Woodsworth from her work on higher education Chief Information Officers. There are many other contributors to the book as well (each chapter is accompanied by comments from experts in the information field), including William Arms, Malcolm Getz, Robert Croneberger, and Carole Cotton.

The book is available for $49.95 plus $3.00 for postage and handling from Ashgate Publishing, Old Post Road, Brookfield, Vermont 05036; (800) 535-9544. ■

TQM: The Parable of the Red Beads

One of the well-known founders of the Total Quality Management (TQM) movement is W. Edwards Deming. Deming gained prominence in Japan the 1950s by enabling Japanese industrial systems to achieve their reputation for quality. In fact, they were so pleased by his work that they awarded him the highest honor to be given to a non-Japanese: the Second Order of the Sacred Treasure; many still refer to TQM as "The Deming Method."

One of the most interesting experiments that Deming conducted has come over the years to be known as the "Parable of the Red Beads." This experiment is critical to understanding the operating philosophy of TQM.

In this experiment, there are several thousand beads in one container, most of which are white and some of which are red. "Management" has decreed that "the workers" must collect only white beads, because that is what customers have decided they want. The workers are given another, larger container and a paddle with holes in it that are just smaller than the beads themselves. The task is to pour the beads, in a precise manner dictated by management, into the larger container, then to extract only the white beads using the paddle. Of course, inevitably some red beads will get into the extracted group.

The work will be monitored by two quality control inspectors. It is the role of the first inspector to record and count the number of red beads on the paddle each time it is removed from the larger container. The other inspector verifies the first inspector's tally and is ultimately responsible for reporting the final count. In addition, although both inspectors continually urge the workers to improve quality, they are in competition with each other to uncover mistakes made by the other as well as by the workers.

Not surprisingly, the quality of results produced in this situation varies, even though each worker adheres to stringent guidelines. After each worker has some number of tries, it is possible to establish data to show the results attained by each worker, and by the group as a whole, and to establish upper and lower control limits.

> *The single most important message here is that the system should be viewed as a whole, that it can be improved, and that flaws in quality come from flaws in the process.*

Deming suggests we can learn five important truths from his experiment.

The first is that *variation is part of any process*. Quality will vary. Mistakes will happen. Results will be different each time the process is executed.

The second point is that, *in order to plan effectively, we must be able to predict and measure results.* Deming has said, "In God we trust. All others must use data." And with good reason. The quantitative measurement component of Deming's philosophy is one of the most distinguishing aspects of it.

Third, in general, *the system in which these workers must perform is beyond their control*, and that leads to lower quality. They work under strict guidelines, and the system, like the container of red beads with white ones among them, is riddled with defects. Nevertheless, the workers can't do anything about it.

This leads to the fourth point, which is an important one. In this experiment, *only managers are in a position to change the system*. They control the procedures and the rules. Even the most talented and skilled workers are powerless to change the monolithic system in which they perform.

The fifth point is that *some workers will consistently be better than others*. This is something every manager can relate to. There are people in any department to whom we inevitably turn when a job needs to be done correctly the first time. And there are others whom we watch closely to try to guard against serious errors.

This understood, Deming offers his conclusion, serving as the very basis of TQM: we should accept variation in human ability as much as possible, and look instead at the system, or the process to improve quality. It is the system itself that must be created and shaped, first to meet the needs of customers, and next, to accommodate the true abilities of workers.

The single most important message here is that the system should be viewed as a whole, that it can be improved, and that flaws in quality come from flaws in the process. ■

TQM: Why Not? Why Not Now?

All too often for many of us, a new idea or approach is met initially with negatives—all the reasons that something won't work or isn't any good or has fatal flaws are the first things that leap to mind. If you are in this stage with Total Quality Management (TQM), the following might be helpful.

First, it is clear that you are already too busy to get into something new. What with the fire-fighting that goes on in the information technology services department and the pressure-cooker atmosphere that has developed, especially with shrinking budgets over the last couple of years, there isn't much room left to be innovative or creative. But this may be exactly the reason that you need something like TQM.

Consider this: in a community college in the midwest, after a study of their information technology problems, it appeared that the institution lacked a cohesive focus for IT; lots of people were doing lots of things, but without the benefit of a strong, unified direction. They considered creating a function that would help bring focus to this area. In achieving a broad understanding in the upper administration about what some of the specific characteristics of this function would have to be, they realized that a majority of the time of the person or persons filling this function would need to be spent among the user community, listening. Unfortunately, most of the people who were currently responsible for providing computing services took great exception to this; one of them in fact said, "How can we possibly spend our time listening? We are already too busy doing." But of course, this was at the very heart of the problem. How could they know they were spending their time doing the right things, if they weren't listening to the users?

With TQM, a purpose is identified: to serve the customer and to do the work that is customer-focused and customer-driven. In addition, by changing the processes by which work gets done, quality can be built in from the start, greatly reducing the need for endless checks, double checks, reworks, reruns, and throwaways—and wasted time. We can't let the rush of day-to-day work and a fire-fighting mentality allow us to wear blinders forever. We need to take the time to step back, remove the blinders, and see what is happening all around us.

> *The phrase "Total Quality Management" may go away, but the underlying principles of customer focus, process improvement, and staff involvement will remain; that's what we have to focus on.*

The second issue is especially for those who are stuck on the word "customers," or who don't want to think about TQM because it's too business-oriented, and "after all, we're just a service within an educational institution." This position needs rethinking. Consider that it's entirely possible that one of the reasons that information technology departments are not thought of with the highest esteem throughout higher education, and are too often thought of as part of the problem rather than part of the solution, is because they have never, for the most part, had any competition. They have had virtually a captive audience all this time, and this has given IT the unparalleled opportunity to be less than excellent. Until IT departments start thinking about running IT the way a competitive business should be run, they are likely to remain in that deadly trap. It is not a coincidence that, at the very same time many of our institutions are questioning the value of information technology, outsourcing is on the rise.

Third, if you are thinking that no one else on campus cares about TQM, you could very well be right. But that doesn't matter. You can do it anyway. TQM will require an investment in time and possibly in money, but once the investment starts to pay off, others outside of IT will start to care. The IT department can be the ones communicating quality to the rest of the institution. Even the president may be swayed into thinking that IT really does have genuine benefit for the institution.

And finally, for those who are thinking that TQM is just a fad, you are probably right. The chances of this being a long-lasting set of tools or techniques with this particular set of perspectives is small. Twenty years from now, or even twenty months from now, you may not often hear the words "Total Quality Management" anymore. But what definitely isn't a fad is what's underneath TQM. The underlying principles of customer focus, process improvement, and staff involvement will remain, and that's what we have to concentrate on. ■

Choosing A New System: Two Schools Do It Right ...

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teachers, and now also meets the needs of future doctors, lawyers, corporate leaders, and other professionals. One of the last three liberal arts colleges for men, Wabash has maintained enrollment in the past five years at around 850.

One, a large, multi-campus, international, complex, undergraduate and graduate institution; the other, a small, single-campus, residential liberal arts college. Yet both, *using the same process*, found solutions to their administrative information systems needs that fit their cultures, their environments, their resources, and their goals.

Both Started With a Needs Analysis

Both schools had a committee in place before they began their projects. The committees had been formed to deal with general administrative computing issues, such as priorities, data administration between offices, and so on, and both committees had wide-ranging representation from across their respective campuses, including faculty. In each case, through the work of the committee, the need for a new system emerged clearly.

Webster and Wabash both had home-grown administrative software that was no longer fully meeting the institution's needs, especially for end-user data access and consistency of data between offices. Duplication of effort, lots of manual work, a great deal of dependence on technical staff to do reports and make changes, and a general sense of inefficiency led both committees to decide that it was time to make a major change and to look carefully at system alternatives.

A thorough, user-oriented needs analysis led things off. What emerged from this was not just an articulation of the needs for technology support of individual offices, but also a greater understanding of the needs of the whole institution. People began to realize, some for the first time, that data collected and maintained in one place could significantly impact activities in other places. In addition, common, institution-wide needs were uncovered, such as being able to easily (but securely) download data from a central repository to a desktop. Both institutions had very fruitful discussions at this point on data access issues: who should see what, who should change what, and for what purposes.

In addition to the fact that the analysis focused on the long-term strategic needs of the institution as well as the short-term, the other important point about the needs analysis is that it covered everyone, not just administrative offices. The committees in each institution were the leading forces, and a lot of attention was given to the operational needs of administrators; still, faculty, students, and the top levels of each school were also full participants in the process.

What resulted from these careful and thorough analyses were complete requirements documents, covering all areas of each institution, emphasizing flexibility, functionality, and the need for solid, future-oriented technical underpinnings.

Then the RFP

Turning the needs analysis into a Request For Proposal was a fairly mechanical process at this point, the difficult work of gaining consensus on the requirements having already been done. The key issue for the RFP was maintaining as much flexibility for each institution as possible (that is, not locking themselves into arbitrary rules or schedules they might regret later on) and allowing for as much of an apples-to-apples comparison of the expected responses as possible.

Because of the structure of the RFPs, evaluating the vendor proposals turned out to be a relatively easy thing to do. Each of the committee members used an evaluation form, highlighting the most important aspects to look for in the proposals; even for those people without a technical background, reaching an objective evaluation of the proposal material was a fairly painless process. Of course, almost everyone complained about the time it took to wade through everything; on the other hand, the committee members saw this as a very important responsibility which they took very seriously. No one wanted the campus computer people to shoulder this burden alone (least of all, the computer people themselves!), and so each took the time necessary.

Another important point here is that although all of the committee members were representing individual areas of their institutions, they were all asked to make a judgement about how well the proposed systems would fit institution-wide needs as well as their own. Everyone felt that this was a particularly important thing to do in a fully integrated system, and would preclude the possibility of choosing a system that was outstandingly excellent in one area but not a good overall solution for the institution.

Digging in deeper

Amazingly, each committee came to a unanimous decision about the three systems that should become finalists (although each committee chose three different ones). In fact, this is not really so amazing; the groundwork had already been laid for this to happen. It was a natural outcome of the consensus-building that had been going on in each institution all along. Even with the different interests and concerns represented, there was an increasing sense in the committees about what was important about the systems and what wasn't, and therefore, which ones would be good choices and which ones would not.

The finalist vendors were asked to come to campus to give demos, and in each case, the institution made up a script for the vendors to follow (again, reflecting both individual and institution-wide concerns) designed to provide as much of an objective comparison as possible.

In addition, peer-to-peer reference calls were made, site visits were done, and information was gathered about the vendors from current and past clients, from visits to company headquarters, and from financial reporting agencies. In several cases, by the way, some of the vendors tried to discourage direct contact between institutions; a fact everyone from both Webster and Wabash wisely ignored.

The peer-to-peer reference calls were especially interesting, because they contained so much subjective as well as objective information, it was sometimes difficult to sort it out. One help was to use the same list of questions for each call, so that the caller could determine whether, for instance, his or her peer was using a current version of the software in question. There is certainly value in the "schmooz" factor of these conversations, but there is a certain baseline as well.

As a result of all this work, each institution ended up making a unanimous decision. Webster and Wabash chose two different vendors, two different hardware platforms, and two different database management systems. But they each chose a solution that is right for them.

Why it worked so well

First, the process was inclusive. Everyone, including clerical staff and faculty, had a chance to make their ideas known and to contribute throughout the process.

Second, the process was consensus-driven. In both cases, the next step was not taken until most everyone felt comfortable with the results of the step just completed.

Third, the process was objective. No one came into it with preconceived notions about the outcome.

Fourth, everyone worked very hard, especially the computer people. For Webster, Mary Petersen, and for Wabash, Bill Doemel (and the folks that work for them), did a huge amount of leading, coordinating, guiding, and coaching.

Were there problems along the way? Of course, as Mary and Bill would be the first to admit. But the bottom line is that both institutions are very pleased with their results, and they should be. They have started on the road to information technology excellence. ■

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Dr. Fred T. Hofstetter
University of Delaware
Guest Editorial
T.H.E. Journal
February 1993

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EDUTECH RESPONDS

Q. **We are reorganizing and combining our information technology related service departments, including academic computing and administrative computing, and we have two questions. First, what is the rationale that is used to combine the telephone administration department into an overall information technology department?**

A. *The rationale is this: the telephone switch, telephone desktop equipment, and the lines connecting all of that need to be managed the same way a central computer system, computer desktop equipment, and the lines connecting all of that need to be. It doesn't really matter that "voice" is the entity being transmitted over the lines. In addition, telephony is much more complex than it used to be; it is no longer a matter of just moves and changes: capacity planning, switch configuration, inside versus outside management, charge-back and resale potential, choice in physical medium, topography, and so on, are all now important issues that need to be dealt with in a manner similar to other technology issues. Telephone administration is an information service that belongs, organizationally, with other information services.*

Q. **Our second organizational question has to do with the library. Have many institutions combined their libraries with their computing departments, or are they thinking of doing so in the future?**

A. *Only a few as yet. While there is some logic to this (libraries are information services in some ways similar to computer centers), many institutions are now beginning to think that, in fact, they are more dissimilar than first appeared to be the case. For one thing, libraries and librarians are more concerned with information management and retrieval, with the emphasis on the information itself; computer people are more concerned with information technology management and the tools with which information can be managed and retrieved, with less emphasis on the information itself. This turns out to be a substantive distinction, especially in the way in which the two groups approach issues of service delivery. It may be that, eventually, the library and information technology support will blend, but for the time being, many institutions that thought this was the way to go are rethinking this strategy, and even uncoupling the two areas once again.*

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